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The Marine Observer

A quarterly journal of Maritime Meteorology

Volume XXXIV No. 203

January 1964

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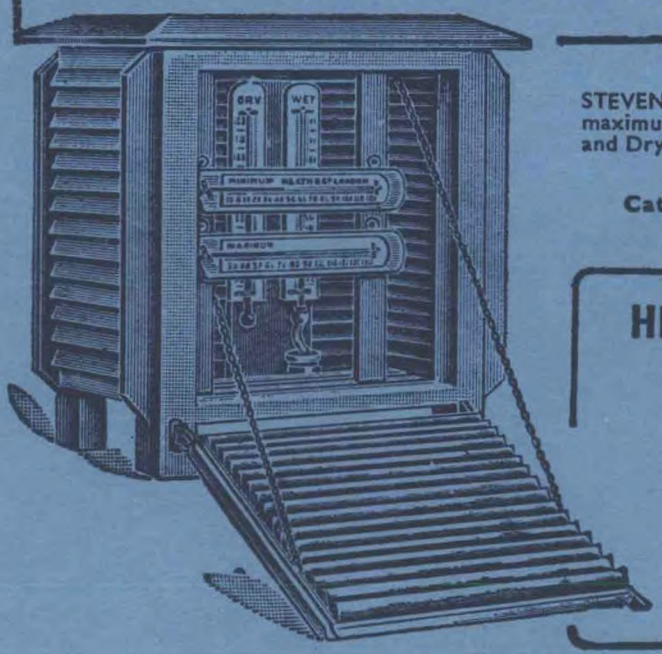

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THE MARINE OBSERVER

A Quarterly Journal of Maritime Meteorology
prepared by the Marine Division of the
Meteorological Office

Vol. XXXIV

1964

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A QUARTERLY JOURNAL OF MARITIME METEOROLOGY PREPARED BY THE MARINE DIVISION OF THE METEOROLOGICAL OFFICE

VOL. XXXIV No. 203 JANUARY 1964

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Letters to the Editor, and books for review, should be sent to the Editor, "The Marine Observer," Meteorological Office, London Road, Bracknell, Berkshire

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Editorial

"There be three things which are too wonderful for me, yea, four things which I know not: the way of an eagle in the air; the way of a serpent upon a rock; the way of a ship in the midst of the sea and the way of a man with a maid."

The words of King Solomon came to the writer on a day last September when, during a Field Study Course on the subject of Weather and Bird Movements, he watched a kestrel, high above the lonely island of Skomer. Such an island, little more than a square mile in extent, is for us who left the sea, a possible substitute for an ocean-going ship and the Field Study Course, which was based 'ashore' at Dale Fort, Milford Haven, was a good opportunity to collect one's thoughts on one, at least, of the questions which vexed King Solomon.

"The way of an eagle in the air." Solomon was perhaps, for all his wisdom, no ornithologist, or perhaps he has been too freely translated and really said "bird", but watching the kestrel, rigid for minutes at a time except for its quivering wing-tips, one could not but wonder if this bird, its habits, its apparent immobility shattered by a sudden swoop to earth where some unhappy rodent had betrayed itself, and its subsequent resumption of station, apparently in its former position, is any less of a mystery today than it was in Old Testament times.

That the regularity of the migration of birds was not unknown in those days is borne out by another quotation from the same source. "The stork knoweth the time of her coming and the time of her departure." This is thought to refer to the great northern migration of the white stork from the Nile valley which takes place in February or March each year. It was witnessed in 1952 from the s.s. *Matheran*, the observation was published in *The Marine Observer* of January 1953, and is probably the most spectacular ornithological observation which we have ever received in a ship's meteorological logbook: for some 45 minutes these ungainly birds were passing over the ship at the rate of about 200 per minute whilst various flights were observed too far away for precise identification.

But the peoples of ancient times, admirable though they may have been as single observers, could have known little of the pattern of weather beyond their own horizons and thus would not appreciate the extent of the connection between weather and bird movement. We, of the twentieth century, with our network of meteorological stations covering the quarter of the earth's surface which is land and the wider network provided by the voluntary observing fleets of many nations covering the rest of the earth's surface which is sea, have learned that, in the British Isles, cold polar air following a depression will stimulate migration, particularly if the urge to move has been furthered by several days of cyclonic weather. We also know that a warm summer which will stimulate the flowering and fructification of various trees will build up a large bird population but (because forest trees do not enjoy two good years in succession no matter how good the second summer is) this will inevitably be followed by a mass migration in search of food. We have found out that migration is stimulated by anticylonic weather, paucity of cloud and precipitation permitting accurate navigation and the weakness of wind reducing the risk of drift; it is also now known that the pattern of a seasonal migration is only repeated on the rare occasion when the weather pattern itself is repeated. The synoptic situations at 0600 on 6th October 1949 and 11th October 1962 bore a close resemblance—high pressure centred near the Faeroe Islands and extending southwards, moving eastwards in the wake of a depression over Scandinavia, produced light easterly winds over the northern North Sea. Cloud cover and height and general meteorological conditions were similar on both these mornings at Wick and Lerwick whilst in both cases the previous night had seen a weak front extending across the North Sea. The repetition of such a pattern in the same week of the year but at an interval of thirteen years is unusual and each of these dates brought an unusually large influx of Greater Spotted Woodpeckers from Southern Scandinavia to the observatory at

Fair Isle. This is just one instance which clearly shows that ornithology is inextricably linked with meteorology.

But there is much more that one would like to know. What, for instance, were the meteorological factors which enabled a Black Browed Albatross, a well known wanderer in the Southern Ocean, to come across the equator and to reach 40°N where it was sighted by m.v. *Armadale* and m.v. *Britannic* within a space of nine days and a distance of 700 miles (*The Marine Observer*, October 1954)? How was it that a Manx shearwater ringed at Skokholm was recovered in Venus Bay, South Australia, in 1961? These are isolated cases, which, although very interesting, the ornithologists would not consider so worthy of study as the regular fantastic journeys that are made by some birds—the Bass Strait shearwater, for example. These birds make an annual figure-of-eight journey—leaving their home in May, they travel north of New Zealand to the Oceanic Islands, thence to Japan, across to California via the Aleutian Islands and so on to the east coast of Australia and home for another breeding season.

The voluntary observer at sea who embraces ornithology as a hobby will, even if he is content to call himself merely a birdwatcher, perhaps for the first time, become aware of many other phenomena worthy of inclusion in his meteorological records—iridescent cloud, the green flash, first and second purple twilights, the zodiacal light, rainbows, haloes—the field is large. Inevitably, too, he will become increasingly aware of wind, sea and sky; this is particularly apparent when studying the flight of an Albatross. Thus will his hobby lead him to a fuller interest in his voluntary meteorological work.

The Editorial in the January number of *The Marine Observer* always ends with a New Year greeting. It might seem to some that this has become so commonplace as to be a mere formality. Not so. Each year sees a number of the personal record cards which we keep for all observing officers marked 'retired' and packed away, and also a number of new cards started as young officers send us their first meteorological logbook. The members of the voluntary observing fleet are always changing yet their spirit and willingness to help are as changeless as the sea itself. To you all, whether you have observed for us for many years or have only just begun, we send our greetings and wishes that 1964 will be for you a year of health, happiness and smooth passages.

L. B. P.

January, February, March

The Marine Observers' Log is a quarterly selection of observations of interest and value. The observations are derived from the logbooks of marine observers and from individual manuscripts. Responsibility for each observation rests with the contributor.

It sometimes happens that we are unable to offer an explanation for phenomena reported. In such cases we shall be very glad to hear from any reader who can put forward an authoritative or a possible explanation, which could be published in this journal. We should also be glad to hear from any reader who has witnessed a similar phenomenon in the past, but which has not previously been communicated to us.

CYCLONE 'DELIA'

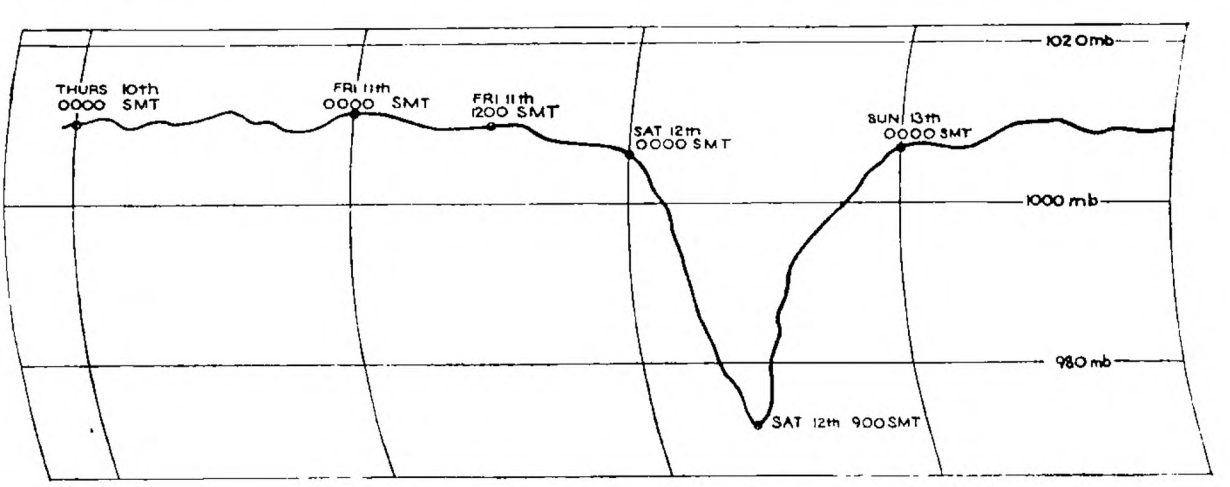
Indian Ocean

m.v. *Welsh City*. Captain A. B. Parkhouse. Durban to Shimizu. Observers, the Master, Mr. T. H. White, Chief Officer, Mr. R. M. Gidden, 2nd Officer and Mr. K. Milburn, 3rd Officer.

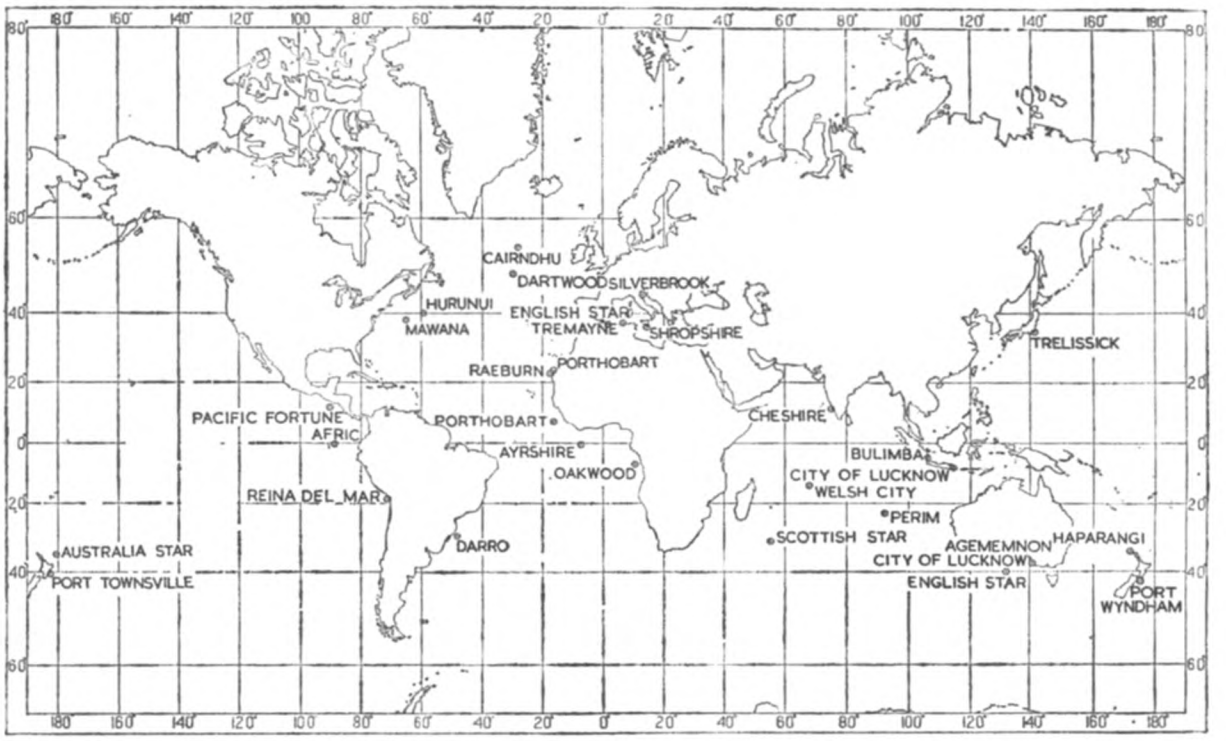
11th Janurary 1963. Speed 13·04 kt. All times shown below are in SMT (5 hours in advance of GMT).

Since the 7th, barometer readings had been taken every two hours and nothing abnormal had been noticed about the diurnal variation. The pressures on the 11th were as follows: 0200, 1008·8; 0800, 1008·6; noon, 1008·6; 1600, 1005·5; 2000, 1006·8; 2200, 1005·3; midnight, 1003·0 mb.

During the morning of the 11th the wind was ESE, force 2, but it increased to SE, force 6, in the afternoon, and to S'ly, force 6–7, in the 8–midnight watch. There was no swell during the morning but by 1600 the log read "moderate sea, low swell"; the 2000 entry was "rough quarterly sea and a heavy beam swell"—i.e. from the SE. Showers had been seen around the horizon in the afternoon and by 2000 rain was



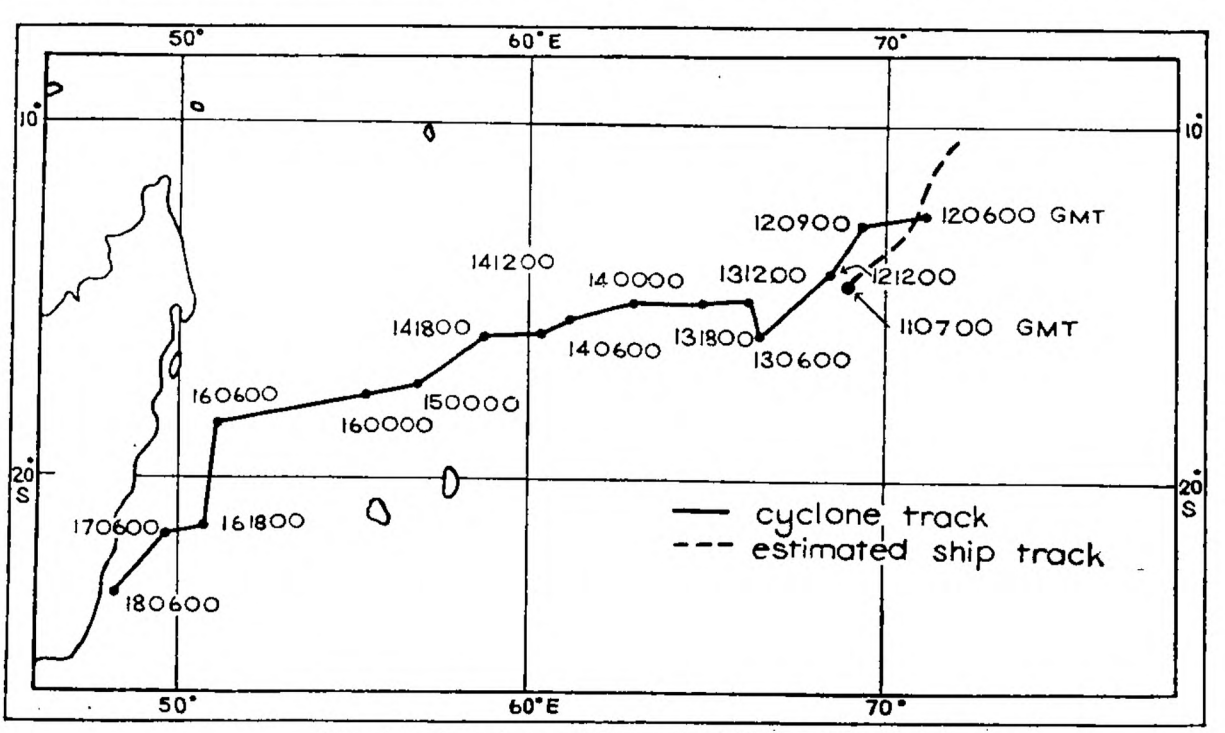
Barograph trace from *Welsh City*.



Positions of ships whose observations are recorded in the "Marine Observers' Log".

falling at the ship. The air temperatures at 1600, 2000 and 2400 were 80°, 80° and 87°F respectively.

12th January. At 0020 course was altered to 033° but the wind shifted from S to ENE, becoming force 10. It then moved gradually to SE, force 10, before returning to ENE, still maintaining the same strength. At 0100 the barometer was 999·2 and pressure continued to fall evenly and quickly until 0900 when it was 974·3: at this point pressure began to rise rapidly again. There had been moderate rain from midnight, but torrential rain began at 0050 which became more or less continuous until 0800 when it began to abate a little. At 0250 course was altered to 090° and the wind shifted again to ESE. Between 0020 and 0250 the direction had veered and backed from between ENE to SW, remaining on no bearing longer than 15 minutes,



Tracks of cyclone *Delia* and of *Welsh City*.

making any estimation of the position of the storm centre practically impossible, as the wind shifts were so erratic, as for instance ENE to S to SE to SSW to E to SW. By now the sea and swell had increased considerably and although the vessel had been eased down she continued to ship heavy water. From 0320 to 0600 the vessel was hove-to. The wind remained ESE, increasing to force 11 and gusting to force 12. Air temperatures at 0400 and 0800 were 75° and 77°. At 0600 the wind became s'ly, force 10–11, then at 0700 it veered to ESE, force 10. After 0800 it shifted from NE to N, force 11–12. At 0900 when the barograph trace began to rise again as steeply as it had fallen, the storm centre was estimated to have passed to the northward of the ship. By noon the pressure was 985·4 and by 1600 it was 997·4. During the 12–4 watch, the wind remained NE, force 7–8, and then gradually decreased in strength until at midnight it was NE, force 5–6. Barograph 1007·4. As the wind lessened, the sea and swell decreased with it. The vessel was put back to full ahead at 1606 and course resumed at 0010 on the 13th.

During the early part of the 11th, the clouds seen were towering Cu. and Ac. formed by the spreading out of their tops. Later there were fair weather Cu. a layer of Ac., and a veil of Cs. Just before midnight SMT the cloud consisted of Sc. and Cs. but after midnight on the 12th the cloud types could not be ascertained as rain and spray cut down the visibility in all directions to less than 100 yd. These conditions lasted until daylight when Fs. was logged. By afternoon the cloud had thinned out appreciably and St. was observed, with the tops of Cb. showing through. At midnight there were Sc. and Cs. and a $22\frac{1}{2}°$ halo surrounded the moon. By this time the sea and swell had become moderate.

Apart from the apparent lack of warning signs and the erratic wind movements, another curious feature of the cyclone was that at frequent intervals during the early morning of the 12th the sea was coming from about 4 points on each bow, while the swell came anywhere from the starboard beam to aft, at the same time.

The Master estimated the vessel to be in the south-west quadrant and altered course to the eastward as this was found to be the most comfortable and the only steerable course to avoid the centre which was estimated to have passed to the northward, travelling westwards. The course was altered point by point as the wind moved around northwards.

Position of ship at noon, 11th January: 14° 39′S, 68° 11′E. Course 055°.

Note. Mr. B. W. Thompson, Director of the East African Meteorological Department, comments as follows:

"Comparing the last known position and the probable course of the *Welsh City* with the estimated cyclone positions as recorded in the Analysis Centre here (see diagram), it appears that this vessel had the unusual experience of encountering the rapid initial development of a tropical cyclone.

The fact that swell from various directions was observed indicates that the ship certainly passed very close to the cyclone centre, if not through it. During the development stage, no pronounced still air core may have formed at the surface and no eye was therefore seen by the vessel. Furthermore, rapidly developing and shifting isallobaric forces are likely to occur in the formation stage, and may well have resulted in the abrupt and erratic wind shifts as described in the ships meteorological logbook.

Summing up, I would suggest that the *Welsh City* moved through the generating stage of cyclone *Delia*, either through the centre itself or very close to it in the eastern sector."

FORMER TROPICAL CYCLONE 'DELIA'

Indian Ocean

m.v. *Scottish Star.* Captain M. R. Bremberg. Beira to Melbourne. Observers, the Master and Mr. A. Symes, 3rd Officer.

19th January 1963. At 0955 GMT when the vessel was in 31° 42′S, 55° 00′E, a weather message was received from Met. Pretoria which included the following report:

"The former tropical cyclone 'Delia' has become an intense low, minimum 985 mb. at 28°S, 50°E, moving south at 10–12 kt."

This position was plotted on the ship's chart and a close watch was kept on changes in pressure and wind. The barometer was falling and the wind was E'N, force 5. During the afternoon the wind increased and started backing slightly and the assumption was made that this was due to the storm centre approaching. The following observations were made, all hours being in SMT.

1600: Wind NE, force 7–8. Bar. 993·4. Cont. heavy rain. Rough sea and heavy N'ly swell.
1800: Wind NE'N, force 9. Bar. 989·0.
1900: Wind NNE, force 10. Bar. 987.2.
2000: Wind NNE, force 11. Bar. 985·4.
2100: Wind NNE, force 11. Bar. 984·5.

At 2121 GMT a further message was received from Pretoria which included the following:

"The intense low 985 mb. at 29°S, 51°E is moving SSE now increasing speed."

It was assumed that there was an additional deep low of tropical cyclone type approaching quickly. Course which had been 112° was altered to 071° at 2125 with the object of keeping the wind on the port bow and getting away from the approaching storm as quickly as possible. It was now thought that the ship was in the path of the storm and heading into the left hand semi-circle of a cyclone which had recurved and which was heading in a general south-easterly direction.

By 2230 engine revolutions had been reduced on account of heavy weather and course altered to 041°. Wind N'E, force 11. Bar. 979·3.

At 2245 speed was again reduced but owing to the heavy rolling in the very confused sea and swell it had to be increased again at 2255 to maintain steerage way.

At 2300 altered course at 036°. Wind N'E, force 11–12. Bar. 974·8. Visibility reduced to less than 100 yd. in heavy rain and spray. At 2310 altered course to 031°. Course was continually altered to keep the swell, which was now tremendously high and confused, on the port bow. The ship, being rather light, was rolling and pitching very heavily and this was the most comfortable position.

At 2347 course was altered to 001°. Weather messages had been sent to Met. Pretoria every three hours from 2200, and a separate TTT message reporting the cyclone was sent to Pretoria and also to all ships, via Cape Town.

At 2400 the barometer reached its lowest point, 974·9 mb. and started rising rapidly, the wind coming in very violent gusts of hurricane force from NNW. No rain, but visibility less than 100 yd. due to spray.

At 0215. Wind NNW, force 12. Bar. 982·5. Altered course to 330°.
At 0300. Wind NNW, force 11. Bar. 987·3.
At 0400. Wind NNW, force 9. Bar. 992·3. Altered course to 075°, increasing speed. Rough sea, heavy swell mainly NW'ly. Pitching and rolling heavily. Visibility moderate to poor at times.
At 0500. Altered course to 090°.
At 0800. Wind WNW, force 4. Bar. 1002·6.
At 1200. Wind WNW, force 4. Bar. 1005·7.

Throughout the period of the storm the air temp. was 70°–71°F.

During the whole time the swell was kept on the port bow, but the wind was backing more quickly than the swell. The vessel was hove-to from 2330 to 0400. There was an exceptionally high sea which was following the wind round as it backed. There was also an extremely heavy swell which caused very violent rolling at times, but this was reduced to a minimum by keeping the swell about 3 or 4 points on the port bow. It appears that the vessel circled, in an anticlockwise direction, the outer perimeter of the storm centre.

It was not possible to make an accurate estimate of the heights of the sea and swell owing to darkness and poor visibility, but their general appearance was consistent with a full hurricane force wind.

Clocks on the 19th were 3½ hr. ahead of GMT and were advanced 30 min. at midnight.

All the barometer readings were corrected.

Position of ship at noon GMT on 19th: 32° 00′S, 55° 42°E.

Position of ship at noon GMT on 20th: 32° 18′S, 60° 30′E.

Note. The following comment has been received from the South African Weather Bureau:

The tropical cyclone *Delia* was clearly indicated on the maps prepared in Pretoria from 12th January onward while it followed a track from a point about 200 miles S of Diego Garcia to its westernmost position just off the E coast of Madagascar at approximately 25°S, 50°E at 1200 GMT on the 18th. At this stage the weather reports of the *Scottish Star* at 30°S, 50°E and of the Swedish ship *Vittangi* at 24°S, 56°E, together with those from Reunion and the east coastal stations of Madagascar, showed that *Delia* was recurving southwards but its central pressure and speed were uncertain. No 1800 GMT reports on the 18th or 0000 GMT reports on the 19th were received from the ships in the vicinity of the cyclone and at 0600 GMT on the 19th, the only report that was directly related to the storm came from the *Vittangi* at 26°S, 51°E.* The wind was NNW, force 7, and the pressure 1002·0 mb. and on the strength of this report the cyclone was assumed to be located at 28°S, 50°E, with central pressure 985 mb. as given in the shipping bulletin quoted by the *Scottish Star*. The 1200 GMT and subsequent 3-hourly reports of the *Scottish Star* were unfortunately received rather late for the shipping bulletin (based on the 1200 GMT map) which was received by the *Scottish Star* at 2121 ship's time, and so the intensity and exact location of the centre could not be accurately estimated.

VIOLENT TROPICAL SQUALL

Equatorial Atlantic Ocean

s.s. *Ayrshire*. Captain P. MacMillan. Dakar to Walvis Bay.

26th March 1963. At 1845 GMT very soon after crossing the equator at 7° 30′W, the vessel ran into a light shower, typical of doldrum weather. A second shower was soon encountered which appeared to be light until the vessel actually entered it, when really torrential rain fell which reduced visibility to such a degree that the forecastle could not be seen. The wind, which during the previous 24 hours had been SW'ly, force 3–4, quickly backed first of all to SE and then 3 or 4 minutes later to NE when it increased immediately to a good force 10. These conditions persisted until the vessel ran clear of the storm cloud at 1945. The wind remained NE'ly for a time, moderating to force 5: later it backed to SW'W, force 4. Apart from its remarkable violence, the storm was noteworthy in view of the fact that there was no instrumental, or other warning of its presence. At 1800: Air temp. 81·3°F, sea 82·6°. $\frac{5}{8}C_L3$, $\frac{4}{8}C_M7$.

Position of ship at 1800: 0° 18′S, 7° 06′W.

Note. The locality of the storm and the behaviour of the winds experienced suggest that it was associated with the Intertropical Frontal Zone, in the region where the NE and SE Trade Winds converge.

The outbreak was of the instability type, very local and not connected with any significant pressure changes, which might have given warning of its severity. When Cu. clouds become strongly developed and change to Cb. with great vertical depth, severe storms may result. By keeping a close watch on cloud development storms of this type can sometimes be anticipated.

VIOLENT SQUALL

North Atlantic Ocean

s.s. *Cairndhu*. Captain G. H. Percy. St. Johns to Liverpool. Observer, Mr. P. Wallace, 2nd Officer.

13th February 1963. The wind which had been E'S, force 10, suddenly veered to SE and increased to force 12 at 0240 GMT. There was very heavy rain which reduced visibility to 50 yd. and the barometer rose sharply from 969 mb. to 971 mb.: the air temp. fell from 45°F to 42°. At 0250, the wind was light and variable and the rain slight, falling from a heavily overcast sky. A further change occurred at 0315

* *Scottish Star's* Meteorological Logbook shows that she did transmit observations at 0812, 1209 and 1745 GMT on 18th January and at 0547, 1350 and 1855 GMT on 19th January; the first four being addressed "OBS Mauritius" and the other two to "MET Pretoria".

when the wind rose to force 6 from the SW and pressure began to fall again. As seen on radar, the squall consisted of two distinct belts of rain running parallel to each other and extending approx. 10 miles to SE and NW of the vessel. They moved away to the NE at a speed of 37 kt.

Position of ship at 0240: 54° 15′N, 28° 40′W.

COMPASS DEVIATION IN THUNDERSTORM

North Atlantic Ocean

m.v. *Dartwood*. Captain J. Elliott. Botwood to London. Observers, Mr. B. L. Bass, 2nd Officer and Mr. J. Roberts, Apprentice.

13th February 1963. At 0440 GMT, the vessel encountered a violent squall, accompanied by large hailstones approx. $\frac{3}{8}$ in. in diameter. The wind increased to force 11–12 from W and there was a great deal of forked lightning and heavy thunderclaps: visibility was almost nil. As the storm was passing overhead, the magnetic compass was seen to be deviated 4° to the W: it returned to its normal position after the storm moved away. Air temp. 38°F at 0440: 40° at 0500.

Position of ship: 49° 53′N, 30° 34′W.

Note 1. The following comment has been received from the Superintendent, Eskadalemuir Observatory, Dumfriesshire, Scotland:

"The magnetic field was moderately disturbed on 13th February with a range of 20′ in declination at Eskdalemuir.

The deviation experienced by m.v. *Dartwood* seems much too large to be part of this disturbance and it appears possible that it may have been due to a point discharge from the mast head. The current up the mast would be increased by the abnormal potential gradient due to the thunderstorm overhead, and by the high wind, but if this is the explanation it is rather surprising that St. Elmo's fire was not observed: the bad weather may explain this."

Note 2. This has been sent to the Admiralty Compass Laboratory.

SEA SMOKE

North Atlantic Ocean

m.v. *Hurunui*. Captain S. C. Andrews. Philadelphia to London. Observers, Mr. J. H. Jackson, 2nd Officer and Cadet D. MacDonald.

1st March 1963. Sea smoke was observed between 0430 and 0500 GMT during moderately heavy rain which had been falling continuously for several hours. It rose to a height of about 3–4 ft. above the surface for the most part, but at times it reached to 70 ft., and visibility was seriously reduced. Immediately after the sea smoke had ceased the rain changed to sleet and then to snow in large flakes. Air temp. 35°F. Sea 66°. Wind NE′N, force 5.

Position of ship: 40° 50′N, 59° 51′W.

Note 1. Sea smoke results from the rapidity with which the cold air becomes saturated by evaporation from the relatively warm sea surface. The sea also supplies a large amount of heat, in addition to moisture, to the lowest layers of air, with the result that a large air-sea temperature difference can only persist while strong or gale force winds continually renew the supply of cold air. There is some evidence that the air temperature has to be at least 16°F less than the sea temperature to allow sea smoke to form.

Note 2. The cold front associated with a depression centred at 41°N, 55°W at 0600 GMT moved from the NW across the track of *Hurunui* at about the time mentioned in the observation, bringing in much colder air over the regions thus accounting for the rain on the front changing to snow. The added moisture in the air due to the falling rain probably assisted in producing the denser areas of sea smoke, the formation of which is described above.

Adriatic Sea

m.v. *Silverbrook*. Captain P. L. Hopkins. Hamburg to Ravenna. Observer, Mr. D. V. Wood, 2nd Officer.

22nd January 1963. Between 0500 and 1030 GMT, when the vessel was at anchor off Ravenna sea smoke was forming continuously. It was quite dense and persisted to a height of 5 or 6 ft. above the wave tops, rising in swirls before dispersing in the

wind. At 0630 a sharply defined fog bank was seen about 2 miles to the southward of the ship. Its leading edge extended in line 120°–300° and rose at an angle of 20° to the vertical up to a height of about 500 ft.—this height being estimated by comparison with other ships at anchor. The fog bank was very dark and dense, ships lying within it not being visible. It extended slowly towards us in a direction nearly opposite to that of the wind. Between 0730 and 0900 the ship was completely surrounded by fog and the sea smoke formed more densely and rose to a greater height. The wind now was NE, force 6. Visibility was reduced to 200 yd. and the sky obscured. By 1030 the fog bank had entirely disappeared and the formation of sea smoke amounted only to occasional scattered delicate wisps. The sky was overcast throughout and there were occasional light snow flurries.

At 0400: air temp. 27·8°F, sea 42·6°. At 0800: air, 26·3°, sea 43·5°. At 1200: air 29·8°, sea 44·0°. Wind NNE, force 5, to ENE, force 6.

Position of ship: 44° 30′N, 12° 22′E.

Note. A very cold NE–ENE airstream affected the Continent, due to the influence of an extensive area of high pressure centred over the eastern North Sea and covering all Europe. At Trieste at 0600 GMT the air temp. was 16°F. (See *Note* 1 below *Hurunui's* observation on the reason for the formation of sea smoke.)

Japanese Waters

m.v. *Trelissick.* Captain W. H. Whitaker. San Pedro to Yokohama. Observers, the Master, Mr. R. G. Lister, Chief Officer, Mr. L. E. Quigley, 2nd Officer and Mr. W. V. Venning, Apprentice.

19th January 1963. At about 1320 SMT during severe W'ly gales of force 10, what appeared at a distance to be waterspouts accompanying dense low frontal cloud, were sighted to the northward. However, as the phenomena drew closer, the sea was seen to be 'steaming' and suddenly the wind veered to NNW and decreased to force 5–6. Simultaneously the air temp. dropped from 48°F to 42·5°, the dry bulb temporarily reading lower than the wet bulb. By this time the sea smoke was in great evidence and the sea became very confused, a condition which persisted for 40 min. The wind eventually increased again to gale force, blowing steadily from NW. The barometer which had been falling for a few hours previously was now rising slowly again. Air temp. 42·5°F, wet bulb 43·5°, sea 60·0°.

Position of ship: 34° 56′N, 141° 44′E.

Note. The synoptic chart for 0000 GMT on 19th January 1963 issued by the Japanese Meteorological Agency, Tokyo, shows that a rather intense depression was centred at 40°N, 146°E, with a cold front lying in a general SW direction from the centre. It appears that the phenomenon reported by *Trelissick* occurred at the passage of this front. There was a marked fall of air temperature as the front passed, the lag in the response of the wet bulb being an indication of the suddenness of the change of air mass. (See note below *Hurunui's* observation on the reason for the formation of sea smoke.)

LARGE HAILSTONES

Mediterranean Sea

m.v. *Shropshire.* Captain L. H. Sheldrake. Suez to Rotterdam. Observer, Mr. C. J. Willard, 4th Officer.

26th February 1963. At 1500 GMT when 15 miles north of Malta the vessel encountered a shower of rain and small hail. After 5 min. the hailstones became large, averaging 0·8 in. in diameter, while some were over 1 in. in size. The shower lasted for 10 min. At this time a waterspout was seen for 25 min. about 10 miles south of the vessel, travelling in a SE'ly direction. A cloud of spray was visible at the bottom of the spout, which was accompanied by thunder and lightning. Air temp. 51°F, wet bulb 48·8°, sea 58°. Wind NE'ly, force 3.

Position of ship: Malta Channel.

Note. The relatively high sea temperature in comparison with that of the air, which was rather damp, would favour the development of Cu. and Cb. cloud. It seems probable that the vertical development of these clouds was greatly increased by the high ground of neighbouring

Sicily. Before hailstones of the size reported can be produced, the convective clouds in which they form must have great vertical depth. In the lower levels of the cloud the hailstones, which are initially small, become coated with water which freezes as the stones are carried to a great height by the turbulent air within the cloud. This process of wetting and freezing may happen several times until the hailstones become too heavy to be supported by the ascending air currents, when they fall out of the cloud.

DUST HAZE

off West African coast

m.v. *Port Hobart*. Captain L. W. Cady. Las Palmas to Cape Town. Observers, the Master, Mr. P. Kelway, 2nd Officer, Mr. J. Fisher, 3rd Officer and Mr. J. Paskins, Junior 3rd Officer.

6th–8th March 1963. The vessel experienced a continuous dust haze from about noon on the 6th until noon on the 8th which at times reduced the visibility to a mile. A moderate amount of red-yellow dust was deposited on board. As a radar watch was maintained, it was observed that the dust caused a circular echo similar in appearance to that produced by a shower of rain. The echo remained at a distance of 14 miles to windward and 15 miles to leeward. The prevailing wind was NNE to NE, force 3–4. During the period the air temp. rose from 65°F to 76°.

Positions of ship: 23° 35′N, 16° 51′W on 6th March, 10° 07′N, 16° 53′W on 8th March.

Note 1. Reports of similar phenomena experienced by m.v. *Aragon* and m.v. *Glenorchy* were published in *The Marine Observer* for July 1962.

Note 2. Reference to the synoptic weather charts shows that for several days before the dust was experienced by m.v. *Port Hobart*, there had been fresh ENE or NE winds over NW Africa. The dust was almost certainly carried out to sea from the Sahara.

Note 3. This has been forwarded to the Radio Advisory Service.

CUMULUS PRODUCED BY FUNNEL GASES

Southern Ocean

m.v. *English Star*. Captain E. C. Laidlaw. Aden to Hobart. Observers, Mr. A. W. Askew, 2nd Officer, Mr. P. J. H. Cannell, 3rd Officer and Mr. J. Roberts, 4th Officer.

15th March 1963. At 0400 LMT a convection cloud was seen forming at about 500–600 ft. above the vessel. It extended up to an estimated height of 1000–1200 ft. at which level it began to taper-off in the direction of the wind. As the total amount of cloud present was only $\frac{2}{8}$, lying near the horizon, it would seem that the local cloud over the ship was formed by rising funnel exhaust gases. It persisted for about an hour, and dissipated towards sunrise. Air temp. 57·5°F, wet bulb 56·9°, sea 59°. Wind SW'ly, force 4.

Position of ship: 40° 06′S, 131° 52′E.

Note. Reports of Cu. type cloud forming at quite low levels over the funnels of vessels have been received at times. (See observations by s.s. *Himalaya* in our January 1960 issue, p. 11; by m.v. *Rangitata* in the April 1961 number, p. 64, and by m.v. *Hertford* in the April 1962 issue of *The Marine Observer*. An article on "Artificial Cloud Formation over Sea" appeared in the January 1963 number.) In the present instance the phenomenon occurred when the vessel was on the SW flank of an anticyclone centred some 300 miles SW of Adelaide.

In such a situation convection is unlikely to be more than very slight and it would appear that the heat and moisture from the funnel gases were just sufficient to set the process of convection in motion.

PHOSPHORESCENCE

North Atlantic Ocean

s.s. *Mawana*. Captain L. E. Jeans. Tampa to Liverpool. Observers, Mr. A. K. Lloyd, 3rd Officer and Mr. W. Bowden, Apprentice.

27th March 1963. At 0315 GMT the sea suddenly became phosphorescent; the horizon from N to NE appeared as a long streak of light, and wave crests all round the horizon gave the impression of ships' mast-head lights seen at a distance. The

sea temp. had been 76°F but at 0345 it dropped to 60°, and by 0415 it had gone down to 56°. During this period the phosphorescence intensified and the air temp. also fell from 65° to 55°. Wind ssw'ly, force 5–6.

Position of ship: 38° 08'N, 66° 00'W.

m.v. *Raeburn*. Captain F. W. Grist. Las Palmas to Montevideo. Observer, Mr. B. H. Lloyd, 3rd Officer.

18th February 1963. Patches of phosphorescence were seen at 2115 GMT in the ship's bow wave. They appeared to be lying at several levels, some on the surface and others down to a depth estimated at 8–10 ft. The surface phosphorescence had the form of very bright concentrated spots of light of about 1–2 in. diameter, while the submerged patches appeared to be as large as about 2 ft. in diameter, emitting a dull glow which faded after several seconds. The latter were observed only in the bow wave, but the surface phosphorescence was seen on the crests of wavelets some 200 yd. away from the ship in all directions. After 2125 only the occasional spot of phosphorescence normally seen in the bow wave was visible. Sea temp. 62°F. Wind NE'ly, force 3. Sea slight.

Position of ship: 23° 41'N, 17° 32'W.

New Zealand waters

m.v. *Australia Star*. Captain G. Cameron Smart. Auckland to Balboa. Observers, Mr. R. J. Thake, 3rd Officer and Mr. J. Atherton, Seaman.

6th March 1963. Between 0100 and 0300 SMT while the vessel was hove-to in very heavy weather, a number of brilliantly phosphorescent creatures were seen under the lee bow. Numbering approximately two to three dozen at times, about half of them were small, oblong in form and estimated at 12 inches in length: the remainder were four to five feet long and roughly square in shape. At times there were more of the smaller variety to be seen, rather than the larger, but never the reverse. The smaller creatures seemed capable of rapid movement, while the larger appeared comparatively sluggish. All lay close to the surface and moved agitatedly when the bow paid off the wind. By the end of the period nearly all had disappeared. Sea temp. 71°F. Wind E'S, force 9. Wave height 30–40 ft.

Position of ship: 35° 42'S, 179° 18'W.

Note. Dr. W. J. Rees, of the Natural History Museum, comments as follows:

"My first impression indicated that salps were involved but these would go deep in rough conditions. They may have been squids of the genus *ommastrephes*; these love to sport in the waves and they are now known to have phosphorescent patches and this may be augmented by luminous bacteria in surface mucus and/or by striking *Noctiluca*. The account is not adequate enough for certainty, but large and medium sized squids are found together sometimes."

DISCOLOURED WATER

Mediterranean Sea

m.v. *English Star*. Captain E. C. Laidlaw. Avonmouth to Suez. Observers, Mr. P. J. H. Cannell, 3rd Officer and Mr. J. C. Roberts, 4th Officer.

18th February 1963. The vessel passed through several bands of discoloured water between 1200 and 1300 GMT, each being about ¾ to 1 mile wide and a pale green in colour. They stretched in a SSE–NNW direction, from the land to the horizon. The sea temp. in one of the bands was 58°F: a reading outside the bands gave 59°. Wind WSW, force 2.

Position of ship: 36° 43'N, 1° 26'E.

Note. Dr. T. J. Hart, of the National Institute of Oceanography, comments:

The lower temperature of the paler water suggests that upwelling inshore may have been followed by rich growth of microplankton, the quantities of which are small in the normal deep pure blue waters of the Mediterranean at greater distances from land. "Blue is the desert colour of the sea" (Schübt).

Vicinity of Galapagos Islands

m.v. *Afric*. Captain R. T. Welch. Balboa to Auckland. Observer, Mr. J. D. Allen, 3rd Officer.

14th February 1963. From 2000 to 2300 GMT, the vessel passed through large patches of water, blood-red in colour, which were several feet wide and varied in length between 20 and 80 yards. They appeared to be composed of many small globular-shaped organisms floating about 2 ft. below the sea surface. Sea temp. 82°F. Low swell. Wind, variable, force 2.

Position of ship: 0° 16'S, 88° 30'W.

Note. Dr. T. J. Hart, of the National Institute of Oceanography, comments:

"I have examined three samples of discoloured water from approximately the north end of the Peru current near the Galapagos Islands. Two proved to be swarming *Radiolaria* and the other *Coccolithophoridoe*. Ciliate protozoa are a further possibility. I cannot understand the opinion as to their being small globular organisms. These microplankton organisms are mostly quite invisible to the naked eye, as individuals, unless a sample is held up to the light, and in this case no sample is mentioned."

South American waters

s.s. *Reina del Mar.* Commodore D. I. Jones, D.S.C., R.D. Arica to Antofagasta. Observers, the Master, Mr. A. C. Gordon, Chief Officer, Mr. P. A. Chadwick, 2nd Officer and Cadets T. Erskine and T. Pimbley.

1st February 1963. From 1730–1930 GMT the vessel passed through patches and streaks of a copper coloured substance which contained areas of white. Some darker streaks of red were also seen. Birds' feathers etc. were noticed in the patches and weed was also present. Two samples were obtained and handed to P.M.O. Liverpool. Sea temp. 66°F. Wind S, force 1.

Position of ship: 19° 05'S, 70° 28'W.

Note. Dr. T. J. Hart, of the National Institute of Oceanography, comments:

"These are most valuable samples. The dominant organism was the minute dinoflagellates *Prorocentrium micans*; in numbers not less than 1,360,000 per litre of water. This confirms and extends recent observations by de Sylva off this coast."

TURTLE

Indian Ocean

s.s. *Perim.* Captain R. Bullock-Webster. Aden to Melbourne. Observers, Mr. D. Farrar, 4th Officer and Mr. N. Bagent, Radio Officer.

14th March 1963. At 0500 GMT a turtle was sighted swimming lazily on the surface: it was a light brown in colour, but no other features could be observed. We were most surprised to see a turtle so far from land (approx. 1000 miles from Australia and 600 from the Cocos—Keeling Islands) and thought that it might have been carried from these islands by the half-knot current setting from 192°.

Position of ship: 22° 28'S, 95° 16'E.

Note. Miss A. G. C. Grandison, of the Reptile Section of the Natural History Museum, comments:

"The turtle was almost certainly a Pacific Loggerhead, *caretta caretta gigas*. While other species of marine turtles do not migrate to any great extent and are usually in rather shallow water, the Loggerhead roams widely and ventures well out into the open sea. An example of the Atlantic subspecies was sighted midway between the Azores and the Bahamas."

WATER SNAKES

Indian waters

m.v. *Cheshire.* Captain T. Cooper, D.S.C. Bombay to Colombo. Observer, Mr. M. J. Horn, 2nd Officer.

20th February 1963. Between 1130 and 1230 GMT when off the SW coast of India between Cannanore and Calicut, numerous water snakes were seen on the surface of the sea. They were sandy-yellow in colour, with black encircling rings, and varied in size from one to two feet in length. Sea temp. 84°F.

Position of ship: 11° 48'N, 75° 12'E.

Note. Miss A. G. C. Grandison of the Reptile Section of the Natural History Museum, comments:

"Sea snakes, probably Banded Sea Snakes, *Hydrophis cyanocinctus Daudin* are common on the west coast of India and is olivaceous or yellowish in colour with black markings, usually in the form of annuli. The species extends from the Persian Gulf to Japan and the Australian Archipelago."

CRICKETS
New Zealand

m.v. *Port Wyndham*. Captain A. J. Hawkins. New Zealand to Aden. Observer, Mr. J. H. Pring, 3rd Officer.

11th–14th February 1963. When the ship was in Napier we were visited by a large number of crickets, many of which accompanied us to Wellington and several to Lyttelton. We sailed for Aden on 5th March and there was at least one cricket in the wheelhouse. By the 13th we were approaching Cape Leeuwin and that evening was the last we heard of our passenger. As we did not hear any crickets ashore, either in Wellington or Lyttelton, can we assume that this one came from Napier and, if so, what did it live on during the month it was with us?

Note. Dr. D. R. Ragge, of the Entomology Department of the Natural History Museum, comments:

"The crickets could have been either *Acheta oceanicus* (Le Guilou) (widespread in the Polynesian Region; fully winged) or *Gryllodes sigillatus* (Walker) (cosmopolitan; brachypterous). Crickets are omnivorous and can feed on scraps of almost any organic material; the one mentioned may have supplemented its diet by eating the corpses of its fellows."

UNRECOGNISED OBJECTS
off Guatemala

s.s. *Pacific Fortune*. Captain B. R. Simons, M.B.E. Los Angeles to Panama. Observers, Mr. D. Whitaker, 2nd Officer, Mr. C. Nicholls, 3rd Officer and Mr. B. Fletcher, Radio Officer.

24th February 1963. At 0000 GMT the sea was smooth and just beneath the surface were observed many elongated objects apparently composed of a jelly-like substance. Their lengths varied from a few inches to 10–15 ft. and all were about 2 in. in diameter. The only movement noticed was when they were disturbed by the ship's wash. Occasionally they broke surface when a wrinkled body formation similar to that of a caterpillar, was seen. The objects might possibly have been a form of weed but they gave the impression of being fauna. Many turtles were also seen in the same area. Sea temp. 84°F. Wind SSW, force 1.

Position of ship: 12° 50′N, 92° 50′W.

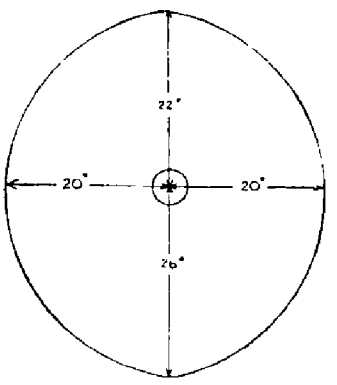
Note. Dr. W. J. Rees, of the Natural History Museum, comments:

"I can only think these may be Salp chains of one of the larger species. The 'caterpillar' body formation suggests this but I would not go beyond the suggestion that it is highly likely they were Salps. Only a few species reach this size and I have seen a chain of about 10 feet in the Mediterranean."

LUNAR HALO
South Atlantic Ocean

m.v. *Oakwood*. Captain L. V. Hort. Observer, Mr. T. D. Willey, 2nd Officer.

8th March 1963. The elliptical lunar halo here reproduced was seen at 0010 GMT



when the altitude of the moon was 45°. It was clearly visible for 30 min. but further observation was prevented by the sky becoming overcast.

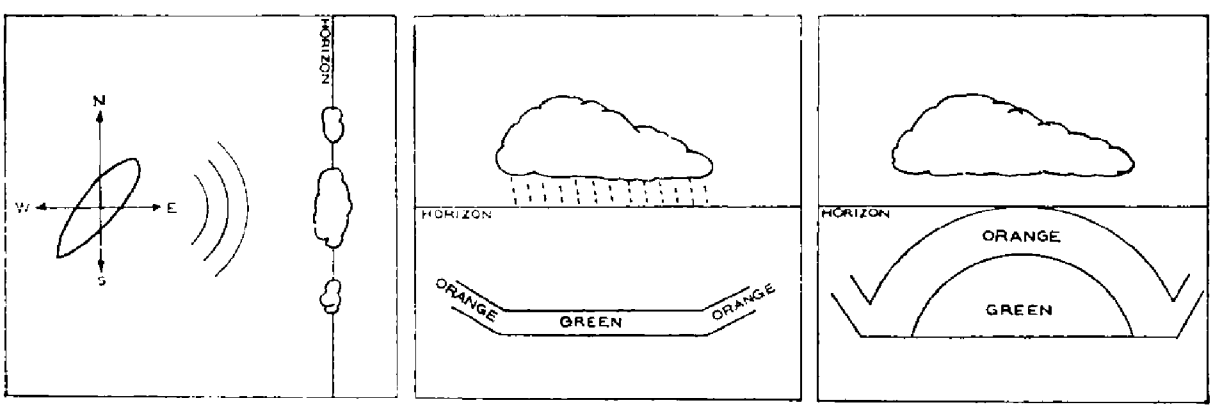
Position of ship: 7° 18′S, 12° 36′E.

RAINBOW

Coastal waters of Brazil

m.v. *Darro*. Captain G. A. Gibbons. Las Palmas to Montevideo. Observer, Mr. C. E. W. Sturcke, 2nd Officer.

15th January 1963. At 1855 GMT part of a rainbow was seen forming between the ship and the eastern horizon; the arc, which was small, became complete by 1858. None of the rainbow was projected against the sky, it had the sea as a background. This condition persisted for 3 min. after which the arc appeared to straighten out, forming a low 'bank' of light, the centre of which was green; the ends—which had become slightly tilted up—were orange.



(Plan diagram) (Elevation diagrams)

During the next few minutes the ends of the 'bank' continued to tilt upwards and inwards until they met, forming an orange arc over the patch of green light. This final shape lasted for two or three minutes and then faded out completely. The sequence is shown in the sketches. Air temp. 74°F, sea 77°, $\frac{3}{8}$ C_L2. Sun's azimuth 265° (approx.); altitude 43° (approx.).

Position of ship: 30° 12′S, 48° 49′W.

Note. This is an interesting example of the manner in which the altitude of the sun (or moon if appropriate) affects the shape of a rainbow. When the sun is on the horizon a rainbow has the largest possible altitude and span. On the other hand, no primary bow can be formed when the altitude of the sun exceeds 42°. When the altitude is 42°, the uppermost part of the primary bow (i.e. the red) is on the horizon, the remaining colours being projected against the earth's surface. These conditions appear to apply in the present instance, the sun's altitude being given as 43° approx. It would seem that the violet and blue of the rainbow were invisible against the background of the sea, leaving only the red (or orange) and the green to be seen,

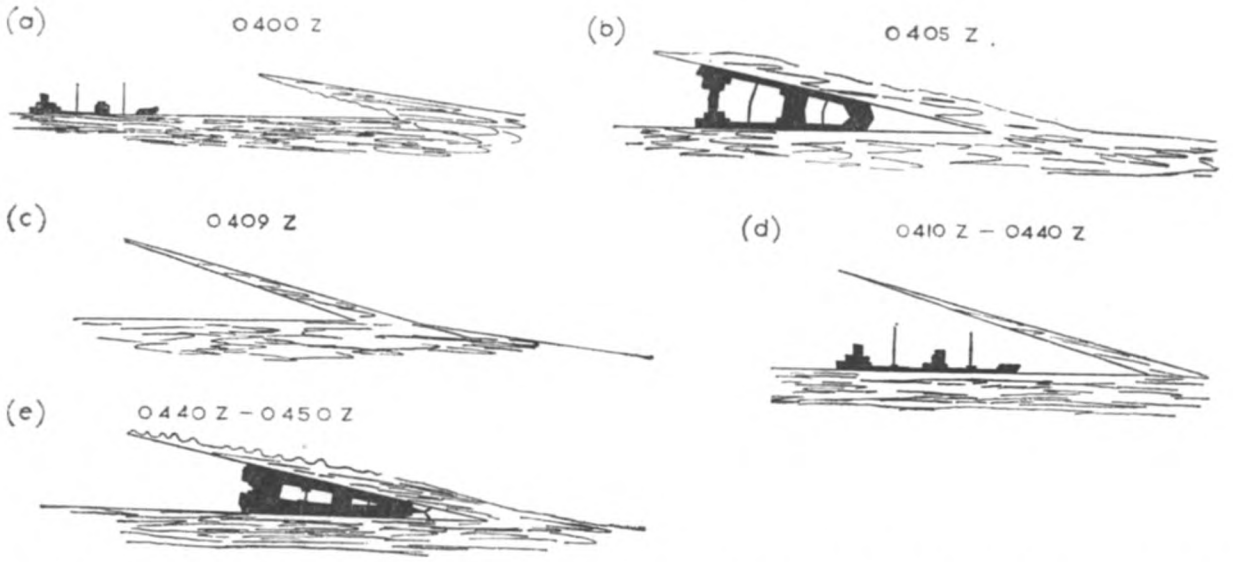
As the sun's altitude decreased during the period of observation (the time was afternoon), conditions would become increasingly favourable for the bow to develop and increase in altitude and this would account, we believe, for the formation of the orange arc, with the green area below it. The whole phenomenon turned upon the fact that the sun was at a critical altitude, as regards a rainbow being able to form or not.

ABNORMAL REFRACTION

off Beachport, S. Australia

s.s. *City of Lucknow*. Captain B. T. Wortley. Melbourne to Adelaide. Observers, Mr. K. Beverley, Junior 2nd Officer and Mr. A. Shopland, Leading Cadet.

12th January 1963. At 0400 GMT a false horizon was observed forming on the port beam and by 0405 it had extended until it covered 5° of the horizon. A vessel just about hull-down was seen to have an inverted image above it, as shown in the sketch, which lasted for about 4 min. The ship and image then disappeared, but approx. a minute later the vessel reappeared with the false horizon still above it,



but no inverted image was then to be seen. At 0440 GMT, however, the image reappeared taking the form shown in diagram (e) and this time a pronounced bow-wave was visible. The horizon assumed its normal appearance by 0450 GMT and there was no sign of the vessel which was proceeding in the same direction as ourselves. Air temp. 67°F, sea 65°. Wind NNW, force 1. Long low swell. $\frac{4}{8}$ C_L 1.

Position of ship: 37° 30′S, 139° 50′E.

Note. When the temperature of the air is markedly higher than that of the sea, atmospheric conditions are especially favourable for the production of inverted images of ships, coastlines, etc.

In the present case, the temperature difference was small and this would probably account for the images being seen only intermittently and with variations, since the light rays from an object would not consistently tend to follow the curvature of the earth's surface.

South Australian waters

m.v. *Agamemnon.* Observers, Mr. J. Pilling, Chief Officer and Mr. D. L. Smith, 3rd Officer.

10th January 1963. For most of the morning visibility had been almost 6 miles, but it gradually improved by mid-afternoon. At 0700 GMT the horizon appeared to become raised above the sea and separated from it by an indistinct misty band. Towards the NW–NE the top of this elevated part of the horizon was very uneven, like a thin layer of Sc. or 'scud'. In other directions, mainly towards the S it took the form of a vague looking row of hills, while in the SE (opposite to the sun) the appearance was that of a bank of fog. It was at this time that Cape Jaffa Light House, which was 20 miles away and had dipped half an hour previously, was observed again. It is listed as 100 ft. high with a range of 15 miles. According to the 'Pilot' it normally resembles the sketch (Fig. 1). What was seen now through 12× binoculars is shown in Fig. 2. The top of the elongated band which extended over about 5°–10° of the horizon was level with the top of the image of the lighthouse. It remained visible for about 15–20 min.

At 0730 GMT a ship was seen astern. It had white masts which were shimmering and were at least three times their real height. As the ship came nearer, 6–8 miles, the masts gradually decreased to their correct size.

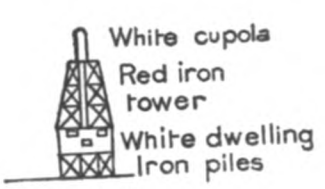


Fig. 1.

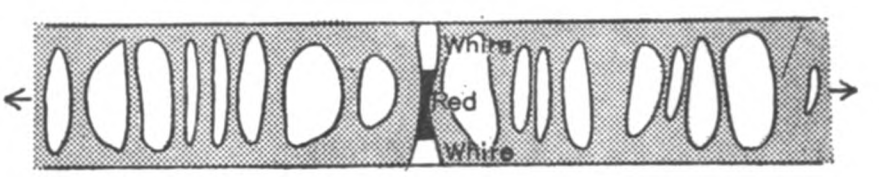


Fig. 2.

The horizon was gradually returning to normal and by 1000 GMT half an hour before sunset there was nothing unusual to be seen. There was no green flash at sunset. The smoke and fumes from the funnel were drifting slowly away on the starboard beam, but instead of dispersing they spread out slowly into a layer at almost the height of the top of the funnel. Air temp. 72°F, sea 62°, wind S'W, force 3. Cloud, $\frac{4}{8}$ Ci., Cc., Cs.

Position of ship: 36° 50'S, 139° 11'E.

Note. m.v. *Agamemnon* is an Australian Selected Ship.

New Zealand waters

m.v. *Port Townsville.* Captain J. S. Moate. Suva to Timaru. Observers, Mr. R. K. Sturge, 2nd Officer and Mr. J. S. Napier, 4th Officer.

16th February 1963. At 1800 SMT when in the vicinity of Cape Kidnapper, the coast line was seen to be markedly distorted due to abnormal refraction, its appearance being as shown in the sketch. Trees on the hill tops were elongated and the

hills themselves seemed to have flat tops with steep sides, although normally they were rounded. Air temp. 70°F, wet bulb 68°, sea 68°.

On the same day at 2045 SMT, Castle Point Light was seen flashing clearly at a distance of 54 miles, though normally it would have been raised at 23½ miles (height of eye 56 ft.). The flash was seen regularly and had the brilliance usually found at a distance of 12–15 miles. A ship's lights were seen ahead at 24 miles. Air temp. 69°F, wet bulb 67·1°, sea 67·8°.

Position of ship: 40° 17'S, 177° 07'E.

Note. The air was warmer than the sea surface beneath it and this would produce conditions favourable for seeing the phenomena described. In such conditions, objects out of sight beyond the horizon become visible, due to the light rays tending to follow the curvature of the earth's surface.

mv. *Haparangi.* Captain W. J. T. Stevens. Opua to New Plymouth. Observers, the Master and Mr. T. Hughes, 3rd Officer.

19th February 1963. When rounding Cape Reinga at 1815 GMT, a perfect reflection of the light was seen on the opposite horizon 180° away. The phenomenon lasted for about 15–20 min. before and after the light was abeam. Visibility at the time was, if anything, inclined to be a little hazy. Air temp. 69°F, sea 68°. Dew point 66°. Wind NW, force 3. Sky cloudy.

Position of ship: 34° 22'S, 172° 38'E.

Note. The phenomenon reported by *Haparangi* is one which must have been seen extremely rarely. The geometry involved is without doubt complex and very full information about the distribution of air temperature and humidity in both horizontal and vertical planes would be necessary before an adequate explanation could be arrived at. It would appear that the reflected image of the light must have been caused by a marked discontinuity, in a horizontal plane, between air masses having substantial differences in temperature and humidity. Such a surface of discontinuity, roughly vertical, would act in the manner of a mirror, reflecting back to the observer the ray which had previously passed him. Reference is made in a letter to the Editor on p. 221 of *The Marine Observer* for October 1963, to a somewhat similar phenomenon seen in the Alps (in March 1893). In a paper discussing this particular example of abnormal refraction the investigator remarks:

"... The mirage occurred exactly at the boundary where the dry, warm, föhn air met the air masses ... bringing water vapour with them.... In this remarkable phenomenon ... the vapour must form a mirror here and cause total reflection."

VOLCANIC ASH

Java Sea

m.v. *Bulimba*. Captain D. C. Murison. Fremantle to Singapore. Observers, the Master and all officers.

17th–19th March 1963. While running up to Sunda Strait on the 17th, the ship experienced continuous light to moderate rain from 1830–2300 GMT. Later, as the rain dried on the ship's structure, it was seen to have deposited a considerable quantity of fine grey dust. Nothing of an unusual nature was seen during the succeeding daylight hours of 18th March when the ship was passing through Sunda Strait, but at 1230 when we were close northward of the North Watcher Light, the Chief Officer, having occasion to use the Aldis lamp, noticed particles of dust drifting through its beam. Conceivably these particles could have been carried by the breeze from the ship's structure where they were deposited by the rain, but during this second night the entire ship became liberally coated with the dust. Except in rain visibility is usually excellent in this area but on this occasion it barely exceeded 12 miles until the 19th at 0200, by which time the ship was half way along Banka Strait. No further dust was observed in the air. The wind was light and variable from between NE and W. When the vessel arrived at Singapore on the 20th it was learned that Mt. Agung in Bali had been in eruption.

Position of ship at noon on 18th: 5° 06′S, 106° 24′E.

s.s. *City of Lucknow*. Captain B. T. Wortley. Brisbane to Aden. Observers, Mr. J. F. Bloore, Senior 2nd Officer and Apprentice Turner.

21st February 1962. 2200 GMT. At civil twilight the sky in the west was seen to be a greenish yellow colour and there was a layer of fine ash, whose colour varied from grey to green, covering the vessel. The sea surface, also, seemed to have a film of fine ash floating on it. At sunrise and for most of the morning the sun was partially obscured by a metallic-looking haze, the sky tending to be darker towards the sun and lighter in the west. The following morning at sunrise, the volcano, Mt. Slamet, on the mainland of Java was observed to be smoking, and it was presumed that the ash from this volcano had been carried on the W'ly winds. Air temp. 80°F. Visibility 6–12 miles. Wind NW'W, force 2. Course 278°. Speed 15 kt.

Position of ship: 8° 57′S, 114° 23′E.

AURORA

The following notes have been received from Mrs. Mary Hallissey, of the Aurora Survey:

The first three months of 1963 produced few reports of auroral activity. Even the Weather Ships could only muster a few glows which broke into rays on three occasions. A summary of their reports is listed below.

As we have mentioned previously, this quiet period is expected as the sunspot cycle reaches a minimum but we would ask you not to stop watching for aurora. During September, for instance, an active sunspot resulted in some unexpectedly big displays and we understand that the personnel of *Weather Surveyor* were kept very busy, if we are to judge by the very fine sketches and reports just received.

DATE (1963)	SHIP	GEOGRAPHIC POSITION		Λ	Φ	I	TIME (GMT)	FORMS
14th Jan.	*Weather Reporter*	59°03′N	18°55′W	070	65	+72	2050–2300	G, R
15th	*Weather Reporter*	58°58′N	18°51′W	070	65	+72	2220–0140	G, R, P
16th	*Weather Reporter*	58°59′N	18°29′W	070	65	+72	2345–2355	G
17th	*Weather Reporter*	58°59′N	18°29′W	070	65	+72	0050–0330	G, HA
31st	*Weather Surveyor*	52°36′N	20°06′W	060	59	+69	0145–0600	G
1st Feb.	*Weather Surveyor*	52°12′N	19°54′W	060	59	+69	0145–0155	G
15th	*Weather Adviser*	59°06′N	19°06′W	070	65	+72	0001	G
20th	*Weather Adviser*	58°54′N	18°48′W	070	65	+72	0300	G
	Weather Adviser	58°11′N	18°53′W	070	65	+72	2225–2244	G, RA
24th	*Weather Reporter*	52°37′N	20°02′W	060	59	+69	2145–2230	G
25th	*Weather Adviser*	58°54′N	18°54′W	070	65	+72	0300	G

KEY: Λ = geomagnetic longitude; Φ = geomagnetic latitude; I = inclination; G = glow; HA = homogeneous arc; RA = rayed arc; R = rays; P = pulsating.

All auroral data come to the Balfour Stewart Auroral Laboratory at the University of Edinburgh. Original reports are forwarded by the Ocean Weather Ship Base and the Meteorological Office forwards data extracted from ships' logbooks. We would draw attention to the note on p. 225 of the October 1963 edition of *The Marine Observer*. This points out that withdrawal of the 'Aurora' Column from the ships' logbooks is not meant to imply that information is no longer required, but that it is to be written in the 'Additional Remarks' section.

We would remind you too that January 1, 1964, marks the beginning of the International Years of the Quiet Sun 1964–65 when a concerted study of geophysical events, complimentary to the International Geophysical Year 1957–58, is to be conducted. It is our task to draw hourly synoptic maps showing the geographical position of aurora. We depend on observers in ships and aircraft for observations over the oceans—so please record every aurora that you may see.

Once again we thank all who find time to help us to make as complete as possible the records of auroral appearances.

551.326.7

The Winter of 1962-63 and its Effect upon British Coastal Waters

By G. A. Tunnell, B.Sc

The 1962–63 winter was the severest in Central England (according to the Meteorological Office Monthly Weather Report) since 1740. Inland temperatures of −20° to −22°C were experienced from 18th–23rd January. The amount of sunshine was above normal and the amount of precipitation was below normal. Snow occurred over most of the British Isles and covered the ground throughout the period of the frost, which lasted from the end of December to the beginning of March. Generally, amounts of snow were not large in January but much of south-east England was under a foot of snow; there were 30–40 inches in parts of south Wales and drifts 25 feet deep in parts of south-west England. In February much snow fell in south-west England, south Wales and north-east England. There was a covering of 1–2 feet in north and north-east England and in south Wales it was 5 feet locally. Northern Ireland was not greatly affected by the severe weather although extremely low temperatures were experienced. Low pressure systems approached the British Isles mainly on the west and south but occasionally on the east causing local tightening of the pressure gradient. Very strong winds indeed occurred in coastal areas generally, particularly over south-east and south-west England towards 20th January and early in February (see Table 1).

Weather Experienced in the Coastal Areas of the British Isles

Figs. 1, 2 and 3 and Table 1 summarise the weather experienced in the British Isles during January and February 1963. Fig. 1 gives the accumulated sum of negative daily average air temperatures (°C). This parameter is a measure of the total cooling experienced. A large value indicates frequent below zero (°C) temperatures; the map may be compared directly with the ice maps published by the Marine Division of the Meteorological Office which contain the Northern Hemispherical accumulation of degree days.* Figs. 2 and 3 give the mean isobars for January and February with isopleths of mean wind velocity.

Intensely cold air masses were driven out of the Arctic Basin by depressions over the Barents Sea, while abnormally high pressure between Greenland and Europe caused this cold air to be driven first into Europe and then westwards over the British Isles. (Figs. 2 and 3 show the flow pattern and mean wind velocity and Fig. 1 gives measures of associated cooling in January and February 1963.) The cold air moved over Britain from the south-east. The severest weather near the sea was in the east and south-east of England and around the Bristol Channel. Conditions on high land were very severe, and from time to time strong winds were experienced all along the western side of the country, over the south-east and occasionally in the east. These combined to cause very cold air to be driven off higher land towards the Bristol Channel, the Mersey and Clyde valleys. In the south-east frozen spray was produced.

* A reproduction of one of these maps is published in each issue of *The Marine Observer* with the North Atlantic Ice Notes.

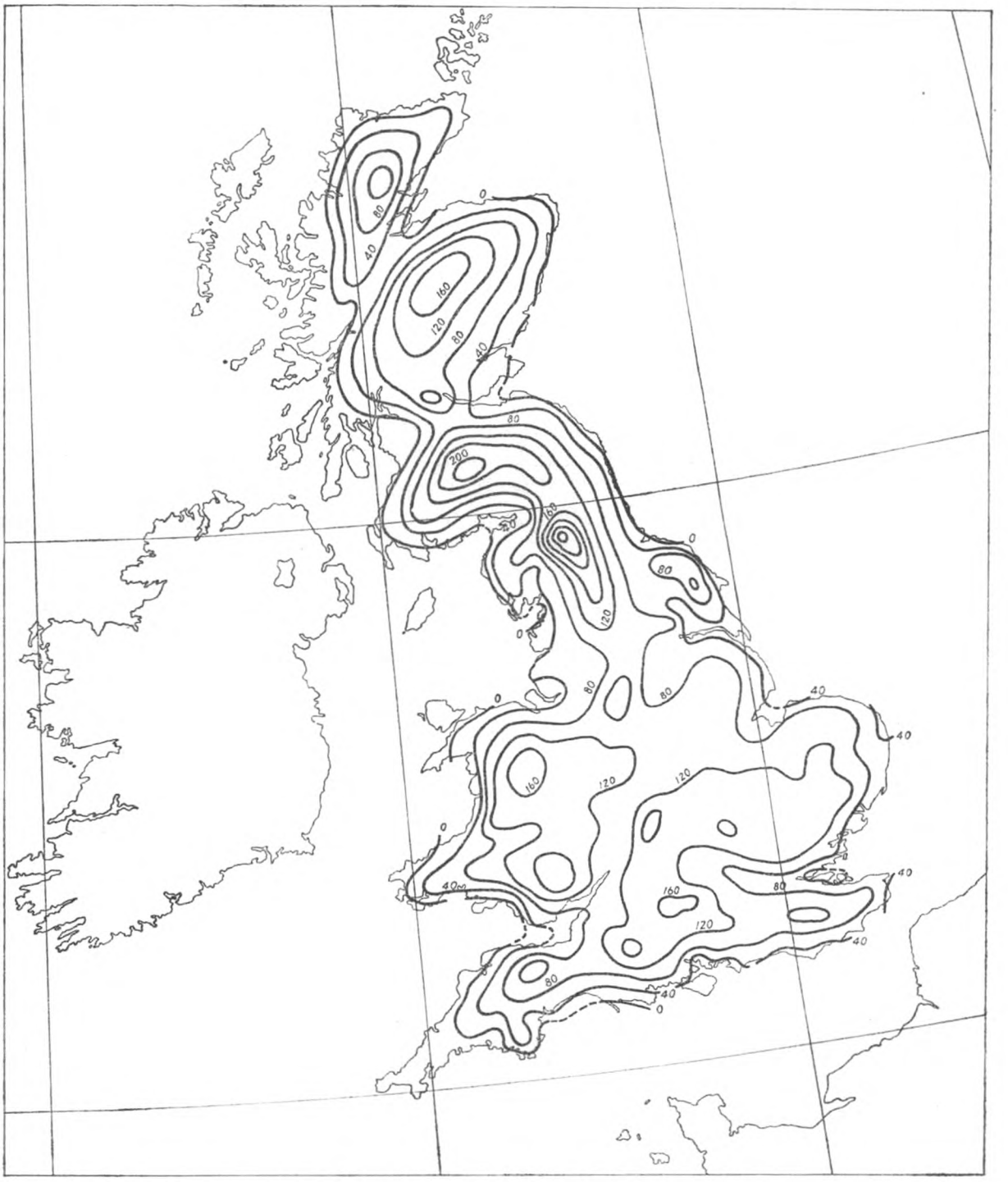


Fig. 1. Accumulated sum of negative daily average air temperatures. (January and February.)

Sea and River Water Temperatures

From the point of view of shipping, the severity of conditions largely depended on the effect the weather had on sea temperatures.

During this period of extremely cold weather, accumulated negative air temperatures were never sufficient to cause any general freezing of the sea—even of the North Sea. Another month could have produced great navigational ice hazards in some estuaries like the Mersey and the Severn. Conditions in the North Sea could have approached those experienced in the Baltic.

Almost everywhere inland the accumulated effect of the frost was sufficient to freeze rivers and lakes completely over. Conditions in the upper reaches of some rivers were so severe that at the thaw great masses of ice were released into the seaways lower down in the estuaries.

(*opposite page 22*)

By courtesy of Scrivens and Sons, Herne Bay

Herne Bay, January 1963. This condition lasted a week.

Copyright Bristol Evening Post

Ice in Bristol docks.

(between pages 22 and 23)

Copyright East Kent Times and Broadstairs Mail

Pancake ice in Margate Harbour.

Copyright East Kent Times and Broadstairs Mail

Ice accretion on Ramsgate East Pier.

(between pages 22 and 23)

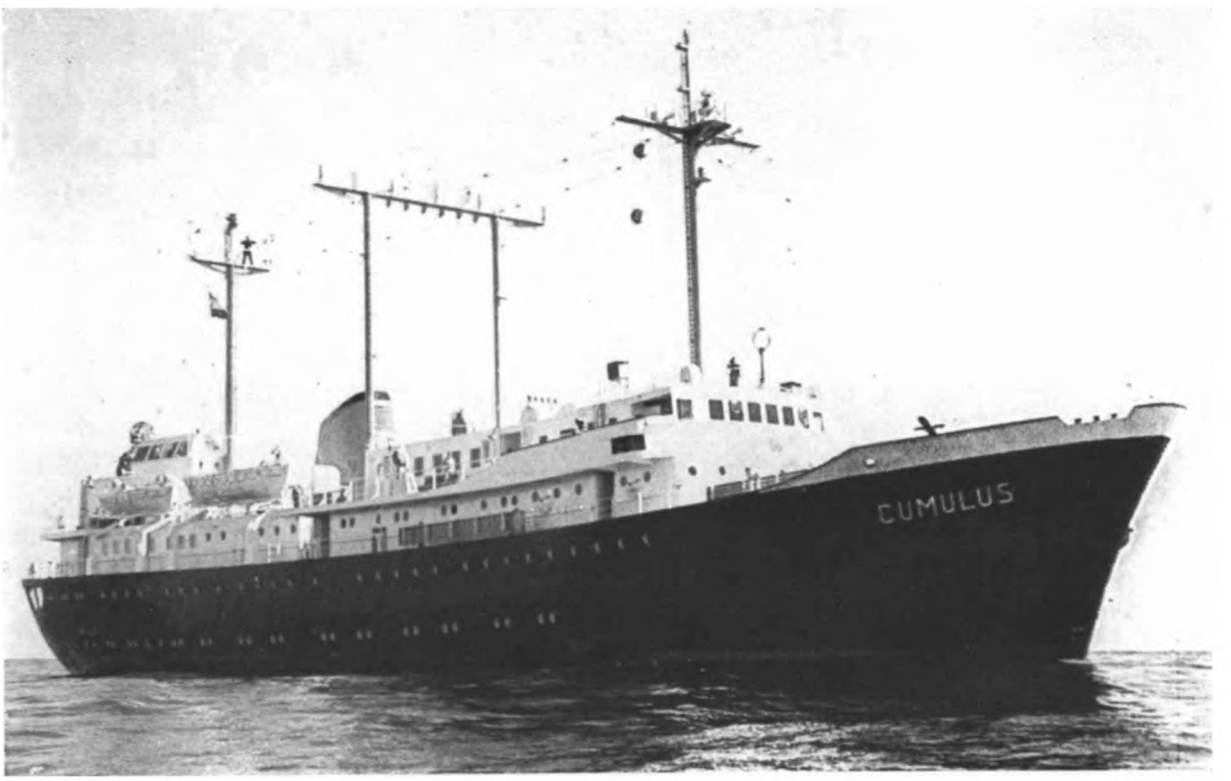
Copyright The Yorkshire Evening Post

River Wharfe at Tadcaster, after the thaw.

Copyright D. C. Thompson & Co. Ltd.

Scene at Newport pier, River Tay.

(*opposite page 23*)



New Dutch O.W.S. *Cumulus* (see page 32).
(above) The meteorological observation room is shown abreast the after lifeboat.
(left) This photo shows the balloon-filling shelter and the radar used for upper wind observations.

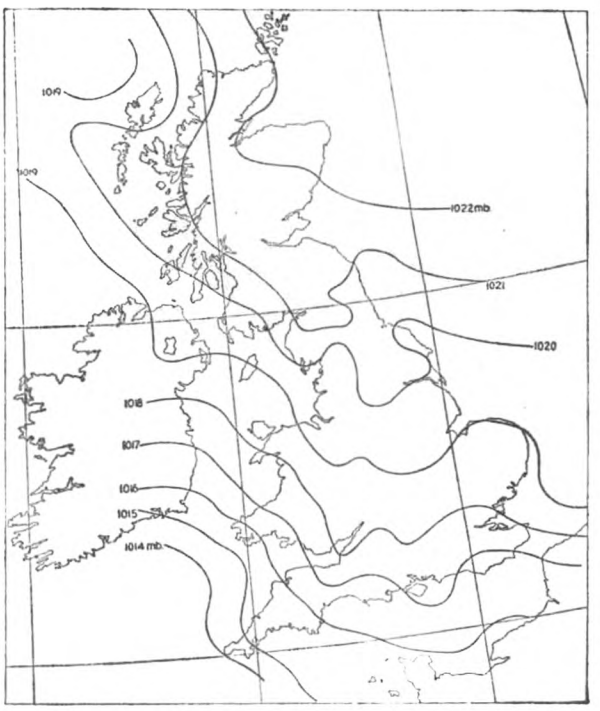


Fig. 2. Mean pressure for January and February 1963. (mb.)

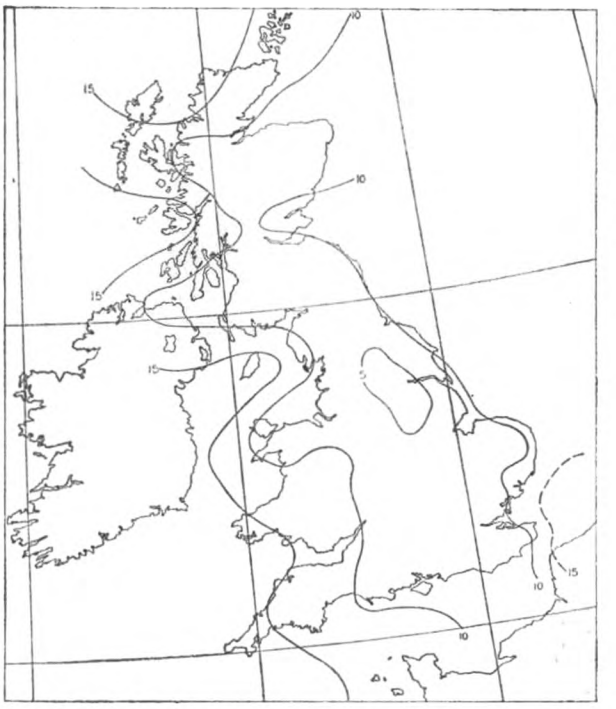


Fig. 3. Mean wind velocity for January and February 1963. (kt.)

In the open sea on the west and south of Britain sea temperatures fell to 3–5°C. The water received directly from the Atlantic was a warming element tending to disperse ice. Serious navigational obstructions occurred when cold fresh water mixed with sea water. A very serious situation arose around the Humber and Wash where the open sea temperatures approached 0°C. This was apparently due to the persistent easterly winds having prevented the relatively warm Channel water from flowing into the North Sea. Figs. 4 and 5 show the gradual retreat of warm water from the Channel and the rapid cooling of the shallow water off the coast. Shallow water on both sides of the North Sea cooled greatly and much ice formed.

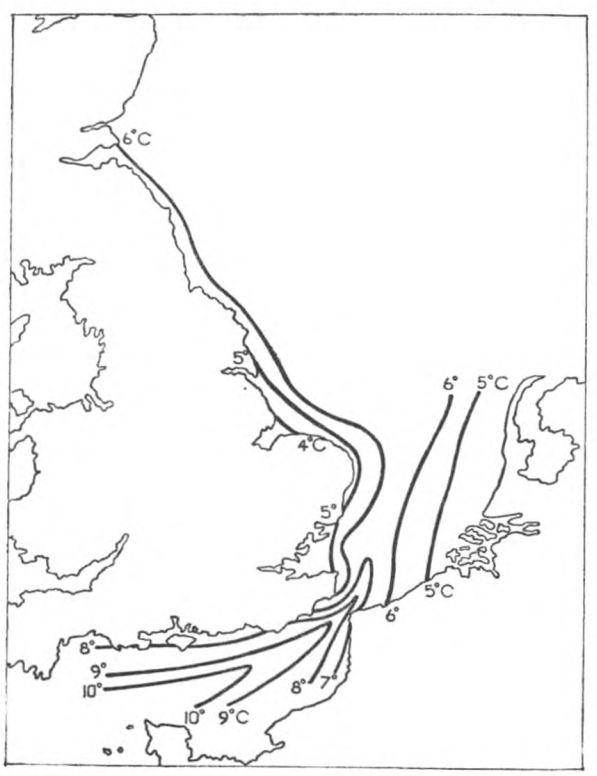


Fig. 4. Sea surface tempatures 26th–30th Decemberer 1962.

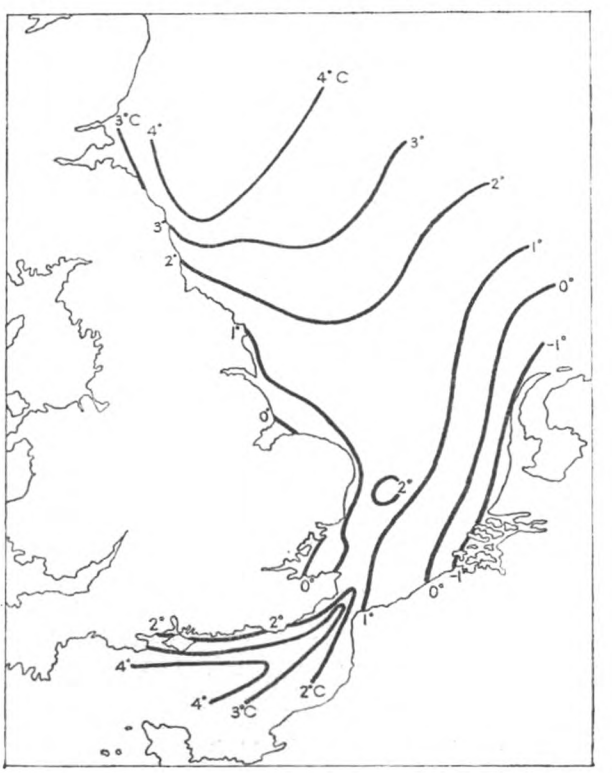


Fig. 5. Sea surface temperatures 24th–28th February 1963.

It is apparent from the ice reports that the water of the Bristol Channel was also extremely cold. This was probably due to very cold water and air flowing into the area from inland.

Warm water from industrial cooling systems kept many port installations clear of ice.

R.R.S. *Discovery* on 25th–27th January 1963 sailed up the Channel and the Thames from Plymouth to London Bridge. In the open sea of the south-west approaches sea temperatures at 10 feet were 8–10°C (49°N; 4–5°W); they were slightly below zero in the Thames Estuary, but from East Tilbury to London Bridge industrial water caused the river temperature to increase to 8–10°C.

Consideration of Reports from Port Authorities, H.M. Coastguards, Lighthouse Keepers and the Press

(Based on information received in the Marine Division of the Meteorological Office)

South-east Coast of England

This coast was probably the most seriously affected, and conditions were at their worst during the latter half of January and early in February. Not only were there low air temperatures and very low sea temperatures but there were also strong winds.

There was very little ice on the open sea off Dover and Folkestone. Occasionally, large floes approximately 200 yards long, 150 yards wide and 1 foot thick were seen about a quarter of a mile offshore.

The General Manager of Dover Harbour Board reported that ice formed on the inner docks 1–2 inches thick extending out 4–20 feet from the walls. Frozen spray was deposited on the dock walls.

Further round the coast towards Ramsgate the extent of ice inshore and over the beaches increased. On 28th January the Harbour Master at Ramsgate observed ice in the harbour. He also reported an area of ice that appeared to be frozen snow 5–6 miles long, two miles wide and consisting of floes of 6 feet diameter and 6 inches thick which drifted from the North Foreland to Pegwell Bay. It drifted into Ramsgate on the flood tide but without affecting navigation. Early in February press photographs from Ramsgate were published showing masses of ice on harbour walls and fittings.

Ramsgate was the edge of an area including the Isle of Thanet, the Medway and Thames Estuary where late in January on into February the amount of ice in the sea, on the beaches and deposited on sea walls etc. was spectacular.

The Engineer and Surveyor at Whitstable stated that ice filled the harbour from 13th–30th January building up with successive tides. Whitstable Bay became covered with ice floes 6 inches thick for at least a quarter of a mile from the foreshore. The amounts of ice were greatest where the sea was diluted with fresh water. However the larger ships were always able to operate fairly freely; it was the smaller ships that suffered.

Fresh water water-ways like the Hythe Canal were frozen over.

One report stated that ice extended seven miles seaward from Birchington.

It was reported on 22nd–25th January that rough ice up to 1 foot thick (occasionally much thicker) covered the foreshores at Sheerness, Canvey Island, Blyth Sands, Leigh-on-Sea and Southend. Many photographs of pancake ice on shallow water round piers, jetties and harbours appeared in the local press of the Medway towns.

There were navigational difficulties in the Medway. Displaced buoys made it difficult for pilots to work at night. Although large ice floes were seen in the Thames Estuary tending to move up river with the tide the Port of London Authority experienced no difficulties with navigation.

East Coast of England

Weather conditions on this coast were almost as severe as those further south. The navigational difficulties appeared to be greater. It is possible that the open sea

was colder but strong winds were less frequent and there were no reports of widespread deposition of ice on upper works of piers and harbour installations. Again the worst time appears to have been in the latter half of January.

The greatest difficulties seem to have been experienced round the Wash, for example at King's Lynn, and in the Humber. Ports south of the Wash like Ipswich, Harwich and Lowestoft had their difficulties where freshwater entered the harbours. It was reported in the Press between 21st and 24th January that the Rivers Ouse, Yare, Colne, Nene, Witham and Welland were also seriously obstructed by ice, requiring special arrangements: for example explosives were used to clear the ice.

The General Manager and Harbour Master of King's Lynn Conservancy Board reported on January 29th that there were no shipping movements in or out of the port because of the movement and obstruction of navigation marks. There was heavy ice on river banks while the water surface had $\frac{5}{10}$ to $\frac{8}{10}$ pack ice, 1–2 feet thick, with isolated hummocked ice 8 feet thick. Large ice floes threatened the safety of the *Lynn Well* Lightship. A press report stated that the fishing fleet at King's Lynn was at a standstill. However large ships continued to move with difficulty.

The Engineer and Manager of the Humber Conservancy Board reported that on 20th January ice formed on sand banks and river banks, floated off at high water and accumulated at Brough. On the 22nd areas of pancake ice 100 yards wide and $\frac{1}{2}$–1 mile long had formed. This consolidated, becoming 6 inches thick. Floes 30 feet long and 3 feet wide eventually filled the river at high tide at Brough. At low water ice extended down through Grimsby Roads and Spurn Gut. Barges less than 120 tons and 100 horse power had difficulty in making passages. Many buoys were put out of action and the *Low Whitton* and *Upper Whitton* light-vessels were moved by the ice in spite of the heaviest holding equipment and reserve anchors.

On 28th January the harbour authorities at Goole, Grimsby, Immingham and Hull reported much ice in and around the docks but no serious navigational difficulties.

H.M. Coastguard at Walton-on-the-Naze and Spurn Point observed very little ice at sea (less than $\frac{1}{10}$ of sea surface covered).

NORTH-EAST COAST OF ENGLAND

Although this coast experienced severe weather particularly towards the end of December on into January there were no serious navigational difficulties until the thaw early in March. The sea was probably warmer off this coast than further south where there is a large area of shallow sea adjacent to the coast.

We received comprehensive reports from the harbour and river authorities of Blyth, Tees, Tyne and Wear and all had similar experiences. In the latter half of December and early in January ice formed in the River Tees above Stockton affecting small craft only. On 19th January ice 4–8 inches thick reached the Stockton area having broken away from higher up the river.

At North Shields the Albert Edward Dock was from time to time covered with smooth ice 3 inches thick which interfered with small craft. There was however very little ice on the Tyne below Ryton, 16 miles from the river entrance.

Small harbours on the coast like Whitby were almost covered with land fast ice 2–3 inches thick.

For a short period around March 6th (about 24 hours) ice floes of 50 square feet and 1–2 feet thick came down the Rivers Tees, Tyne and Wear. From Victoria Bridge, Stockton, to the South Bank Wharves of Dorman Long the river was choked from bank to bank with ice. In the Port of Sunderland ships could not be moored to buoys and it was reported in the Press that ice floes 15 feet across and 1 foot thick floated slowly down river affecting the swing bridge at Newcastle, Tyne Dock entrances and the North Shields Fish Quay. H.M. Coastguard reported $\frac{5}{10}$ of pack-ice 1 foot thick at the Tyne entrance on 6th March.

There were widespread reports of heavy concentrations of ice in the rivers of north-east England during this thaw. Conditions were obviously very severe inland from the coast and areas of fresh water had been heavily iced.

East Coast of Scotland

Weather conditions were probably not as severe on this coast as those of north-east England. The severest conditions appeared to be towards the middle of January but navigation was affected throughout January because concentrations of large ice floes moved down the larger rivers continuously. Much of this ice was deposited in shallow water.

Parts of Leith Docks had a covering of 1–2 inches of ice on 12th–13th January but the main approach channel was not affected. In the latter half of January 1½–2 inches thickness of ice formed over parts of Dundee Harbour where the water was only slightly disturbed. The River Tay was not greatly affected but appreciable amounts of pack-ice 3–4 inches thick moved down the river to 10 miles beyond Dundee Harbour (7 miles beyond its normal limit). In the upper reaches of the river the ice was sufficiently concentrated to force buoys adrift.

The Harbour Engineer reported on 8th February that Aberdeen Harbour had been frozen over many times by ice 2–3 inches thick which caused from time to time some difficulty in the opening and shutting of dock gates. Navigation had not been affected but the tug *Sea Trojan* had her cooling system choked by fine granules of ice.

On 28th January H.M. Coastguard at Rattray Head reported that a beach patrol found no snow or ice on beach or sea north or south of the headland.

West Coast of Scotland

There was less ice on the west coast of Scotland than on the east. The weather was very severe in the central lowlands of Scotland. Glasgow had some of the lowest temperatures in the British Isles and occasional strong winds. However, the warm Atlantic waters seem to have kept all the coastal seaways clear of ice. When the final thaw came early in March heavy ice came down the Clyde from inland as in north-east England but it remained for six hours only in contrast with the 24 hours of north-east England.

We received reports of no ice from all along the outer isles and the west coast of Scotland, for example Cape Wrath, Ardnamurchan Lighthouse, Isle of Islay, Rudh Ré Lighthouse, Greenock Harbour, Ardrossan Harbour and Mull of Galloway Lighthouse.

The Harbour Master and Traffic Superintendent, Clyde Navigation Trust reported at the end of January that the River Clyde had been free of ice from Glasgow to the sea but at the beginning of March he was surprised by the heavy ice (one inch thick) that moved down the river affecting small passenger ferry services. This ice disappeared in six hours.

During January there was much ice where fresh water entered the sea. Most of the River Clyde above Glasgow was completely frozen over; the Kyle of Durness near Cape Wrath had a covering 6 inches thick; parts of Stranraer harbour and Loch Ryan had a covering of ice which apparently was the first observed in thirty years.

North-west Coast of England

Serious difficulties were experienced in the southern part of this area during the latter half of January although not as serious as those of 1942 and 1943.

Harbours washed by the warm saline sea water, like Whitehaven, and the harbours of the Isle of Man and Holyhead had no difficulties but large relatively shallow estuaries like the Mersey and the Dee cooled greatly during the frost and almost reached freezing point.

Measurements of water temperatures in the Mersey towards the end of January (provided by the Marine Surveyor and Water Bailiff) showed that at high water at the West Bank Power Station near Widnes, which is well up river where salinities are low, temperatures were around 0°C; in the estuary they were −1°C at the surface and −½°C at the bottom (35–70 feet below the surface). Out in Liverpool Bay at the *Bar* Lightship temperatures fell from 3°C to slightly above 0°C. Fortunately salinities

off Liverpool docks remained continuously at 30 parts per thousand and ice moving down from the upper reaches of the Mersey tended to disperse. Further severe cooling however could have produced a very great amount of ice.

Heysham, Preston and Liverpool all had interference with navigation by ice floes. The River Wyre at Fleetwood was not greatly affected.

A most striking phenomenon was the widespread deposition of ice on river banks and beaches. Thicknesses were from a few inches to several feet extending out to sea for more than 100 yards from the high water mark. Formby, Southport, Morecambe, Heysham and Preston all experienced heavy ice on beaches and river banks.

The Harbour Master at Preston reported that ice from the upper reaches of the River Ribble moved up and down the river forming a mass of ice 10 miles long, while some of this ice deposited on the beach at Lytham prevented the lifeboat from mooring.

On 19th January sheets of ice first formed over the very extensive banks of the Mersey above Widnes where it is thought freshwater had percolated. These banks were later covered by tidal water and floes 80 feet long and 6 inches thick were seen at Widnes and Runcorn on the 21st and floes 50 feet long reached Eastham on the 22nd. A stream of ice 7 miles long and 1,000 feet wide formed in the estuary. Only small amounts of ice formed in Liverpool Docks but many small floes covered the river outside the dock gates.

The Harbour Master of the Manchester Ship Canal Company reported no obstruction whatever from ice.

Wales and the Bristol Channel

Ports and harbours facing the Irish Sea and St. George's Channel experienced few navigational difficulties. In the latter half of January there was $\frac{3}{10}$ of pack-ice 5 to 10 inches thick in Rhyl harbour, $\frac{4}{10}$ of land fast ice 1 inch thick at Pwllheli; Fishguard was not affected by ice.

At Milford Haven small amounts of ice 1 inch thick formed on the docks in the latter half of January and two feeder lakes were covered with ice several inches thick for a number of weeks.

Conditions became progressively more serious as one moved eastward up the Bristol Channel towards the Severn Estuary.

Ice covered the foreshore on the west side of Swansea Bay from high water mark to $\frac{1}{2}$–$\frac{3}{4}$ mile out to sea and there was much ice on the banks of the River Avon at Port Talbot.

Bristol, Cardiff and Newport were all very seriously affected towards the end of January and early in February. The Rivers Ely, Usk and Avon froze over above the fresh water point and there were large ice floes, on average 6 inches thick but occasionally several feet thick, in the lower reaches of these rivers with even larger floes in the Bristol Channel.

Tugs and cargo ships were used as ice breakers in docks and approach channels which tended to be completely covered with ice several inches thick. It was reported that Bristol City Docks experienced the worst conditions in living memory. They were most serious where there were fresh water feeders into the docks. Newport North Dock, for example, was completely frozen over.

South-west Coast of England

Harbours seemed to be free from ice difficulties all round this coast from Hartland Point to Portland Bill. Rivers had temporary coverings of ice but this did not appear to have any great effect upon ships.

South Coast of England

The worst conditions occurred on this coast as elsewhere towards the end of January. Ports where the water approaches are fairly deep as at Southampton and Portsmouth and to a lesser extent at Newhaven, Shoreham and Cowes were largely unaffected.

However there are shallow water harbours with many freshwater feeders much

used by small craft. These were very severely affected. An area of this type was Lymington where the harbour was covered with $\frac{10}{10}$ of ice 4–5 inches thick in the centre and 8–9 inches thick at the edge. In Chichester harbour vessels were sunk, moorings ripped up and many navigational buoys were swept away. In contrast to this, the keeper of the lighthouse at St. Catherine's Point, south of the Isle of Wight, saw no ice whatever. Shallow harbours round Southampton Water and the Solent all had much ice with thicknesses from a few inches to almost 1 foot. Steamer services to the Isle of Wight were affected.

Parts of the Sussex beaches that were sheltered from easterly winds were covered with rough ice 6 inches to 4 feet thick depending on the location.

The River Rother at Rye froze for $2\frac{1}{2}$–3 miles producing floes 80 feet long 40 feet wide and 1 inch thick. This was probably typical of south coast rivers. All the ice on the south coast cleared quickly when weather conditions improved.

Coasts of Northern Ireland

Northern Ireland had no difficulties due to ice.

Reports of ice received in the Marine Division have been summarised in tabular form and can be obtained on application to the Meteorological Office. The complete set of reports will be kept in the Meteorological Office archives for comparison with any other similar period of extreme weather of the future.

The Weather Systems that Produced the Abnormal Winter

These unusual conditions were brought about by the abnormal, yet stable atmospheric circulation over the North Atlantic Ocean in January and February 1963. The pattern of pressure and temperature anomalies (see Figs. 6 and 7) for January 1963 and December 1961 are so similar that it appears likely that the special conditions associated with the situation existed in both the consecutive winters of 1961–62 and 1962–63. Conditions in the latter winter were more intense and lasting

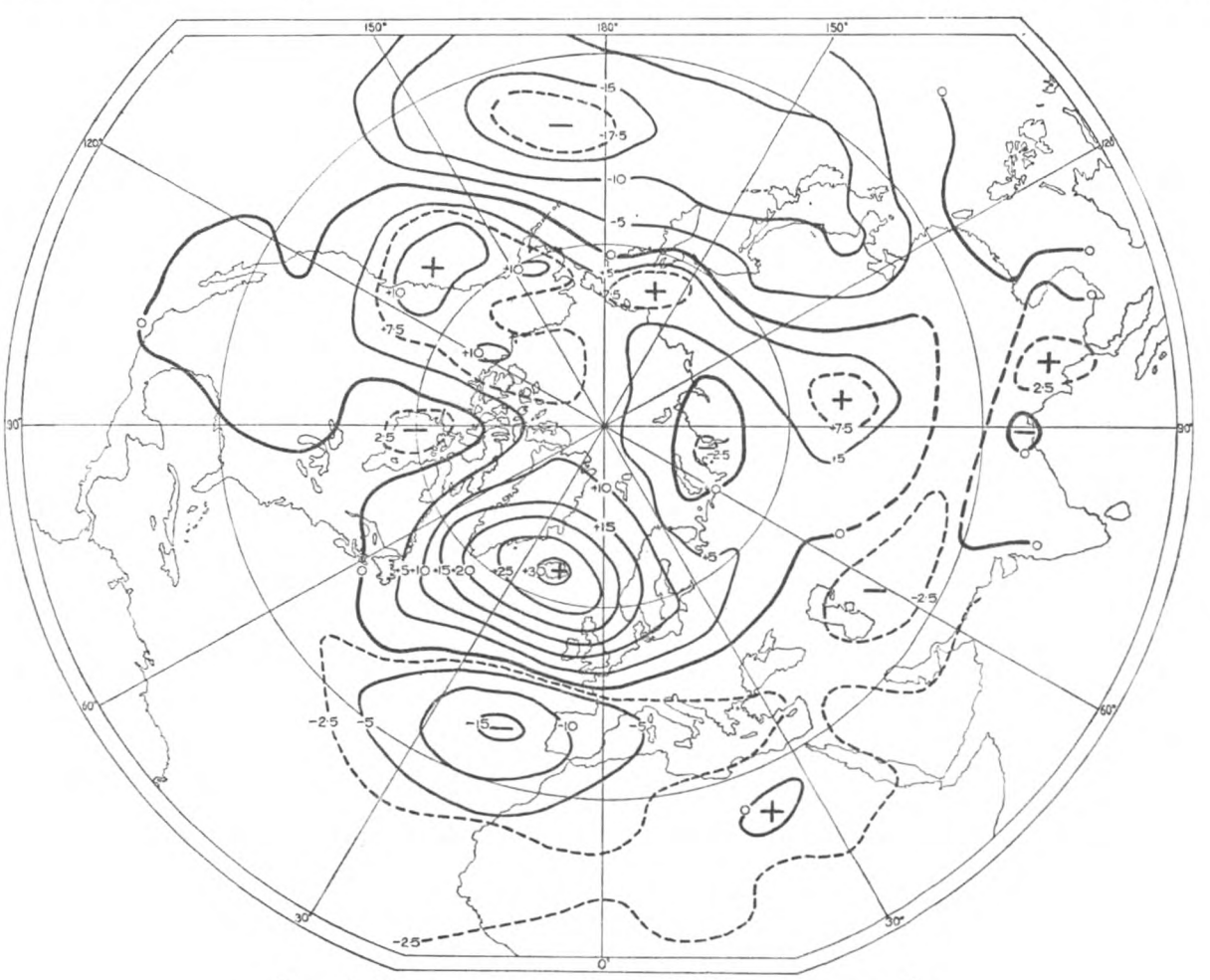


Fig. 6. Pressure anomalies (mb.) for January 1963.

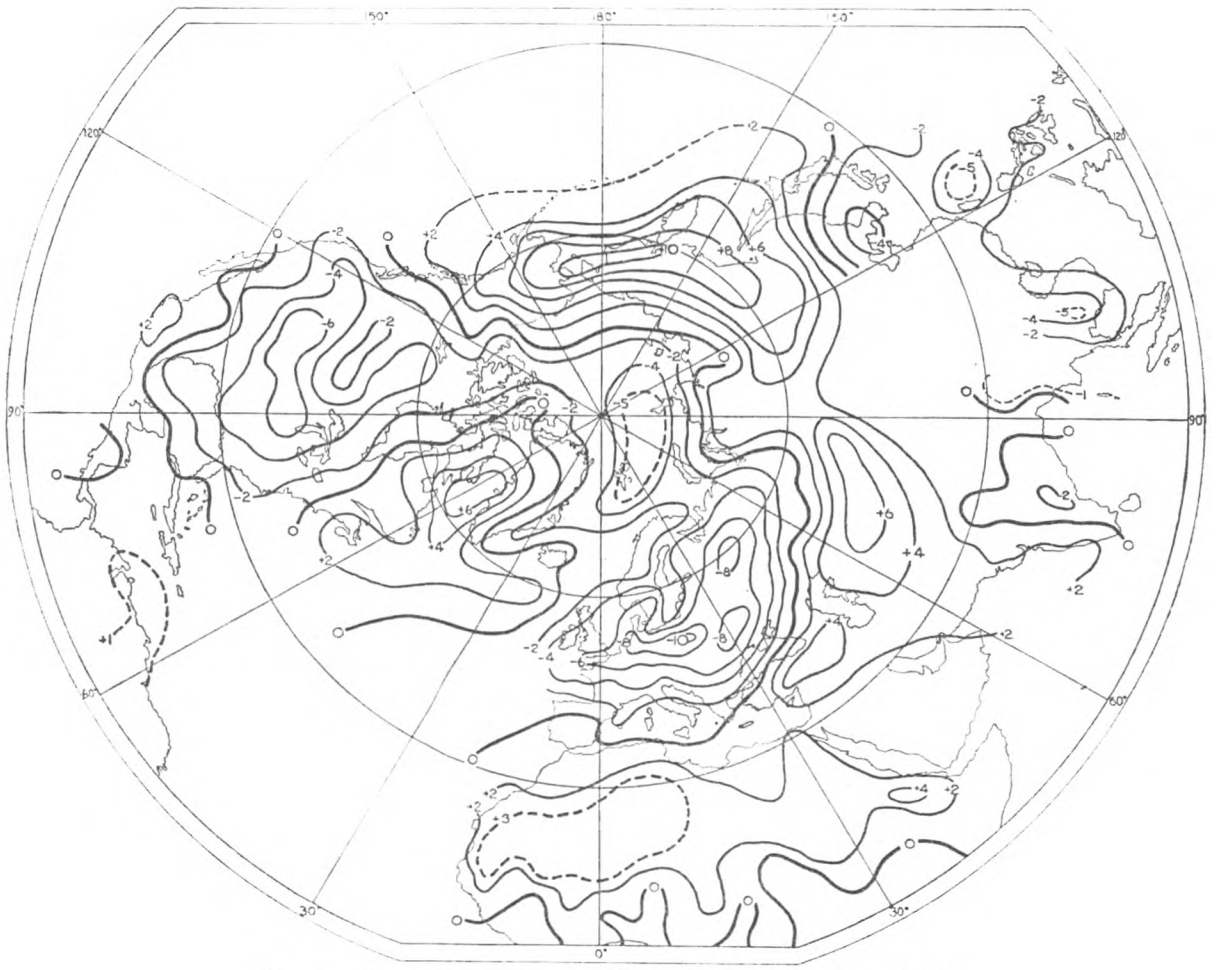


Fig. 7. Temperature anomalies (°C) for January 1963.

so it seems probable that any significant characteristic would have increased during the passage of the year.

Fig. 6 shows that in the 1962–63 winter, pressure was abnormally high between Greenland and Europe, and abnormally low over the Azores and Mediterranean, the Barents and Kara Seas, and North Pacific. The Azores 'High' and Iceland 'Low' had changed places and pressure was very low over the Barents and Kara Seas. Depressions frequently moved from the Atlantic either north-eastwards, north of the high pressure area, to the Kara and Barents Seas or eastwards, south of the high pressure area to the Mediterranean, frequently intensifying by taking into their circulations very cold arctic or continental air.

In addition to the anomalies described above three further factors were common to the two winters. There was a continuous increase in the area of arctic pack-ice east of Greenland and north of the Arctic Circle associated with an abnormally small area of pack-ice off Greenland in the Denmark Strait. Almost continuously from September 1961 the atmosphere over the Russian side of the Arctic Basin was abnormally cold (see Fig. 7). In December and January 1961–62 it was on average 7°C below normal, while in January and February 1963 it was 10°C below normal. A third factor which has been conspicuous is abnormally high sea surface temperatures in the Barents Sea. At the end of 1961 temperatures of the Barents Sea were over 5°C (possibly 5°C above normal) and they were of a similar magnitude at the end of 1962 in the west (south of Spitzbergen); however, there was much ice moving southwards in the extreme north-east.

The unusual atmospheric circulation caused Baffin Bay and the Davis Strait to have an abnormally warm winter.

Conclusions

The conclusion to be drawn from this period is that the weather during this cold spell was very uniform over the British Isles and it was physical features like the

Table 1. Climatic Summary for a Selection of Coastal Stations

Place†	Height of Station Ft.	Month	Wind: Mean Hourly Wind Speed	Wind: Highest Hourly Wind: Veer from North	Wind: Highest Hourly Wind: Speed	Wind: Highest Hourly Wind: Hour Ended at: day	Wind: Highest Hourly Wind: Hour Ended at: hr	Wind: Highest Gust: Speed	Wind: Highest Gust: Day	Wind: Highest Gust: Time	Air Temperature °C: Means of: Max.	Air Temperature °C: Means of: Min.	Air Temperature °C: Mean Temperature Mean of A and B	Air Temperature °C: Difference from Average	Air Temperature °C: Highest Maximum and Lowest Minimum: Maximum	Air Temperature °C: Highest Maximum and Lowest Minimum: Date	Air Temperature °C: Highest Maximum and Lowest Minimum: Minimum	Air Temperature °C: Highest Maximum and Lowest Minimum: Date	Snowfall and Rainfall†† (Terminal Hour 09 GMT): Total Fall (ins.)	Snowfall and Rainfall†† (Terminal Hour 09 GMT): Percentage of Average	Snowfall and Rainfall†† (Terminal Hour 09 GMT): Most in a Day: Amount	Snowfall and Rainfall†† (Terminal Hour 09 GMT): Most in a Day: Date	Weather (Number of days): Snow or Sleet	Weather (Number of days): Snow Lying at 09 hrs.	Weather (Number of days): Hail	Weather (Number of days): Ice or Snow Pellets	Weather (Number of days): Air Frost	Weather (Number of days): Grass Minimum Below 0°C.	Bright Sunshine: Daily Mean	Bright Sunshine: Percentage of Average
			kt.	°	kt.	day	hr	kt.		hr min.	A	B																	hrs.	
Wick (1)	119	Jan	12·0	290	33	25	22	52	25	22 00	3·0	−1·6	0·7	−2·7	6·9	26	−9·2	18	1·50	51	0·27	29	17	13	0	11	15	23	1.22	86
		Feb	13·3	140	39	14	13	55	14	12 45	4·0	−0·7	1·7	−1·8	6·9	23	−5·5	17	0·82	41	0·21	7	16	3	0	7	16	21	2·99	114
Inverness	13	Jan									2·8	−2·8	0·0	—	7·8	26	−7·8	11,18,19	0·21	—	0·09	30	1	26	0	0	23	28	1.36	—
		Feb									4·3	−2·6	0·9	—	9·4	28	−6·1	13,19	0·21	—	0·12	11	5	5	0	0	23	28	3·20	—
Aberdeen (2)	170	Jan	6·9	270	20	25	22	33	20	04 10	2·7	−2·8	−0·1	—	6·1	25	−10·6	18	1·39	49	0·29	4	12	15	6	1	19	26	1·70	104
		Feb	7·0	120	22	6	16	35	6	05 15	2·7	−2·8	−0·1	—	5·6	22	−7·8	24	1·37	65	0·57	7	14	16	2	0	22	28	3·43	129
Dundee (3)	147	Jan	12·7	100	36	20	11	53	20	10 35	2·5	−1·8	0·3	−2·3	6·7	26	−7·8	13	1·73	61	0·46	4	15	25	0	4	20	30	1·85	—
		Feb	10·1	110	35	6	19	49	6	19 00	3·2	−2·3	0·5	−2·8	7·8	27	−6·7	26	1·91	88	0·88	7	9	13	0	6	20	27	3·55	—
Edinburgh (Turnhouse)	114	Jan	9·4	030	43	20	12	66	20	12 20	2·5	−2·4	0·1	−2·7	8·2	26	11·3	13	1·72	71	0·49	29	17	16	2	7	22	26	1·35	—
		Feb	7·2	090	28	6	16	41	6	14 55	3·5	−4·7	−0·6	−4·0	9·4	27,28	−14·1	3	1·07	65	0·22	7	16	16	0	7	25	28	3·17	—
Stornoway	11	Jan	15·3	080	41	20	14	55	20	13 30	4·5	0·4	2·5	−1·8	7·3	25	−7·2	12	1·01	24	0·23	15	12	3	0	6	14	21	2·13	188
		Feb	18·3	190	48	26	19	71	26	18 55	5·2	0·0	2·6	−1·8	9·6	28	−6·2	17	0·40	15	0·10	17	12	0	0	1	12	22	2·71	124
Glasgow (Renfrew)	26	Jan	7·4	100	37	20	10	56	20	09 55	2·6	−2·7	−0·1	−3·2	8·8	26	−13·8	13	0·72	15	0·27	29	12	1	1	2	21	24	1·30	116
		Feb	7·4	100	31	6	17	48	6	17 40	2·8	−3·2	0·3	−3·6	8·7	28	−8·7	4	0·44	13	0·23	7	12	6	0	4	24	26	2·76	131
Tynemouth (4)	95	Jan	14·2	100	37	20	09	49	20	12 05	2·6	0·1	1·3	−2·7	5·9	26	−6·2	23	2.03	87	0·43	3	18	8	8	0	11	23	1·30	—
		Feb	9·9	090	32	6	10	42	6	10 05	2·0	−1·7	0·1	−4·3	4·1	17	−7·4	25	2.96	179	0·70	7	20	11	5	0	21	25	1·93	—
Hull	88	Jan									2·3	−2·1	0·1	−3·6	6·7	26	−8·3	25	1·23	52	0·35	3	8	9	0	0	20	30	1·43	114
		Feb									2·0	−3·8	−0·9	−5·1	5·6	26	−10·0	26	1·30	71	0·38	14	11	28	0	0	28	28	2·23	103

Gorleston	12	JAN	13·9	070	37	19	16	52	19	15 50	1·1	−2·3	−0·6	−4·6	5·0	26	−10·3	25	0·88	40	0·25	4	16	8	1	0	25	27	1·62	94
		FEB	10·9	140	24	6	11	36	1	01 55	1·2	−2·0	−0·4	−4·6	3·3	8	−7·5	5	0·89	56	0·39	7	16	14	2	1	25	28	2·77	113
Shoeburyness	7	JAN	16·3	070	45	19	15	68	19	14 30	0·4	−2·8	−1·2	−5·2	5·0	27	−10·5	13	0·76	42	0·22	31	16	19	0	1	27	29	1·33	77
		FEB	11·7	080	32	2	10	42	2	09 25	1·2	−2·3	−0·5	−4·8	4·0	14	−10·3	4	0·72	55	0·25	1	19	15	0	2	27	28	2·87	110
Dover	19	JAN									0·8	−2·7	−0·9	−5·4	4·4	3,4,27	−7·2	13,14	0·79	28	0·32	1	11	30	0	0	28	31	1·88	—
		FEB	9·0	040	29	2	12	38	2	11 25	1·7	−1·8	−0·1	−4·6	4·4	26,28	−4·4	22,25	0·96	47	0·27	7	15	10	0	0	23	27	3·17	—
Portsmouth (Thorney Island)	10	JAN	8·7	050	25	19	13	47	19	12 10	0·8	−4·0	−1·6	—	5·4	26	−9·1	13	0·55	18	0·24	3	11	27	0	0	29	30	2·79	—
		FEB	7·9	050	20	2	13	35	2	13 40	2·8	−2·3	0·3	—	7·3	27	−7·0	25	1·33	65	0·60	14	16	9	0	2	23	25	2·93	—
Plymouth (The Hoe)	119	JAN	10·9	—	30	9	18	54	9	17 30	2·4	−2·8	−0·2	−6·2	6·1	28	−6·7	14,25,26	0·86	20	0·27	3	3	6	0	0	27	28	3·22	163
		FEB	10·3	—	35	5	22	49	14	09 50	4·9	−0·2	2·3	−3·5	8·9	8	−5·6	2	2·97	96	0·60	6	10	1	0	0	15	21	3·26	114
St. Marys, Scilly Is.	158	JAN	17·3	080	39	18	14	60	18	15 45	4·9	2·1	3·5	−4·2	8·1	5	−3·0	19	0·85	24	0·21	29	5	1	0	3	7	—	2·14	108
		FEB	14·8	110	32	18	19	59	14	04 40	6·8	3·5	5·1	−2·2	11·2	15	−5·1	2	4·48	165	1·15	5	6	1	4	0	2	—	3·44	120
Bristol (5) (Filton)	192	JAN	7·7	030	27	19	17	49	19	16 35	−0·6	−5·2	−2·9	—	4·1	29	−14·3	15	1.63	53	0·89	3	11	31	0	0	28	29	1·98	—
		FEB	8·5	130	25	14	12	39	6	00 25	2·3	−2·8	−0·3	—	7·0	8	−10·2	4	1·08	50	0·25	6	19	15	2	1	22	26	2·70	—
Holyhead (Valley)	26	JAN	9·0	050	33	19	24	54	19	23 45	2·1	−2·2	0·5	−5·1	9·0	27	−8·0	23	0·75	21	0·31	29	9	1	1	0	22	28	3·00	160
		FEB	8·7	130	32	6	02	50	6	00 35	4·9	−1·6	1·7	−3·7	11·4	27	−5·5	20	0·47	21	0·14	6	8	1	1	2	21	25	4·71	168
Liverpool (Speke)	80	JAN	7·3	080	32	19	24	55	20	00 10	1·3	−3·3	−1·0	—	5·7	26	−10·7	24	0·88	31	0·21	3	15	29	2	1	25	28	1·75	—
		FEB	8·9	130	24	5	19	39	5	22 50	2·6	−2·1	0·3	—	6·3	27,28	− 7·7	2	0·70	44	0·24	7	13	11	0	3	24	26	2·93	—
Douglas (6) Isle of Man	284	JAN	18·4	090	46	1	01	68	20	01 35	3·1	−0·4	1·3	−3·4	7·8	26,27	−3·9	13,23	1·28	26	0·48	3	10	6	0	1	15	26	2·43	132
		FEB	18·4	110	53	6	10	67	6	09 30	3·2	−1·1	1·1	−3·5	5·0	8,21,27	−3·9	3	1.39	44	0·49	7	4	6	0	0	19	26	3·94	156
Londonderry (Ballykelly)	3	JAN	8·8	100	35	19	04	53	19	03 45	3·1	−2·1	0·5	−3·9	5·8	25,29	−10·3	13	1·00	29	0·39	15	12	6	2	0	22	29	2·43	154
		FEB	10·9	120	53	6	03	68	6	02 05	4·2	−1·1	1·5	−3·3	7·7	21,27	−6·5	18	1·23	52	0·46	13	9	6	1	0	18	24	3·13	116

† A number in brackets indicates that wind observations have been taken from a nearby station. These are (1) Dounreay, (2) Dyce, (3) Leuchars, (4) South Shields, (5) Avonmouth, (6) Ronaldsway.

†† To get the equivalent fall of snow multiply values by 10 [1″ rain = 10″ snow]

effects of the Straits of Dover, the distribution of shallow water off the coast and the incidence of fresh water and sea water that decided where difficulties were experienced by ships. It was also evident that if our winters get colder, conditions could be very much worse. Surveys of water temperatures and salinities up and down a waterway with records of accumulated negative air temperatures could give a clear warning of a potentially dangerous situation.

It also seems possible that a long period of severe weather may be associated with abnormal distributions of air and sea temperatures and of ice in high latitudes evident some months earlier.

My thanks are due to all the harbour officials, lighthouse keepers and H.M. Coastguards who have sent us ice reports and photographs; also to my colleagues of the Marine Division of the Meteorological Office who collected the information on which this article is based.

551.507.22

The New Dutch Weathership "Cumulus"

By Captain Harm A. de Boer, master

On the 19th April 1963 this new weathership sailed for the first time to fulfil her 24 days at her ocean station.

This newly built ship was especially designed for the weather services and replaces the old ship of the same name, a rebuilt American frigate, which has served as a weathership from January 1950 until replacement and which made 95 voyages during her time of duty.

The Netherlands have two ocean-station vessels, named *Cirrus* and *Cumulus*, and they occupy stations Alpha, India, Juliett, Kilo and Metro in co-operation with the United Kingdom, which has four ships, and with France and Norway which have two ships each.

The period spent on station is 24 days and it takes 4 to 7 days from Rotterdam, which is the home port of the weatherships, to reach the different ocean-stations, so that a whole trip takes 32 to 38 days. The time spent in the home port varies from 9 to 21 days.

As stated, the Netherlands weathership service was operated until now by two rebuilt ships, as was done by the other European operators, except the French, who in 1959 brought two specially built ships into service.

The new *Cumulus* was built in the shipyard Gebr, van der Werf, at Deest near Nijmegen and was launched on December the 22nd, 1962. On the 31st of March she was towed to Rotterdam where the masts and funnel were set up, because she had to pass several fixed bridges on her way from Deest. On April the 8th she sailed for a three days trial trip on the North Sea, where, off *Galloper* light vessel, speed trials were held.

Favoured by good weather and calm sea the new ship made her official trial trip on the 18th of March. While proceeding down the New Rotterdam Waterway, off the Hook of Holland, the ship was christened by Mrs. M. Backer-van der Hoek, wife of the Director-General of the Rijksluchtvaartdienst (civil aeronautical service). In the afternoon, while she was in the North Sea, the ship was officially taken over from the builders by the Director-General of the Rijksluchtivaartdientst, who acts as owner on behalf of the Netherlands government.

The new *Cumulus* has a length of 216 feet, a breadth of 41 feet, her draught is 15 ft. 4 inches and she has a gross tonnage of 1974 tons. She was built under the highest class of Bureau Veritas and comes up to the requirements of the Netherlands shipping inspection service for passenger ships.

The ship is divided into six watertight compartments and has four decks. On 'A' deck are the wheelhouse, chartroom, radio transmitting room and the officers' saloon, and the upper part of the meteorological office. On 'B' deck are situated the

officers' cabins, the radio receiving room and the meteorological office; on 'C' deck are, on the port side, the radio and meteorological officer's cabins and on the starboard side the messrooms, pantries and galley. The crews' cabins are also on 'C' deck. There is a crew on board of 52 men and each of them has his own well-furnished cabin; every two or three cabins share their own toilet and shower.

Special precautions are made regarding fire protection and all compartments which can present fire risk are isolated by means of asbestos. The whole ship is connected to a Saval sprinkler installation, which automatically starts to spray when the temperature rises above 79 degrees Centigrade.

The ship is propelled by a six-cylinder four-stroke Werkspoor diesel engine of 1400 h.p. and gives a maximum speed of 12·8 knots at 280 revolutions, the cruising speed is 10 knots at 240 revolutions and on station we make 140 rev. Electric power is delivered by three Bolnes diesel two-stroke, five-cylinder engines.

There are 4 lifeboats made of polyester (2 motorboats with a capacity of 18 persons each and 2 hand-propulsion boats with a capacity of 44 persons each), all being placed under gravity davits and capable of being electrically hoisted. Over and above this there are two inflatable life-rafts for 20 persons each.

The radio office is modern and well-arranged, transmitting- and receiving-rooms being separate; there are 17 transmitters and 12 receivers for telegraphy and telephony.

The meteorological office is divided into two compartments; in the lower compartment are the recorders and the radar, used respectively for receiving and computing the radio-sonde observations of pressure, temperature and humidity in the upper air and for tracking the radar target for upper wind observations.

The other compartment is on top of the highest deck and dominates the whole ship. Here the observer is seated and has a clear view through the windows around and above him, so that he can see all the changes in the weather situation at once. Here there are distant-reading instruments for air and sea temperatures, humidity and wind direction and force.

Abaft the meteorological office there is a room about six metres high where the radio-sonde balloons are inflated, and on top of this inflating room the upper wind radar scanner is located. This Silenia radar, made in Italy, has a wavelength of three centimetres, is stabilized in all directions and automatically follows the radar target attached to the radio-sonde balloon; last trip a maximum distance of 117 kilometres and a height of 31 kilometres was attained.

This radar is also capable of tracing precipitation and frontal systems within an area with a radius of 250 nautical miles around the ship. It is also used for giving navigation fixes to aircraft.

Amidships there is a laboratory for oceanographic survey and a winch to lower thermometers and water scoops to any desired depth; for getting deep soundings associated with this work there is, in the wheel-house, a Kelvin Hughes echo-sounder with a range of 9000 metres.

In spite of the high superstructure, the ship behaves very well at sea and does not roll much, owing to her dimensions, which were tested at the naval experimental station at Wageningen, where experimental models were towed and tested in a basin in which any desired wave height and direction can be reproduced.

The conclusion of everybody on board the ship after the first trip to station 'India', situated about 400 miles west of Scotland, when most of the time we had force 8 to 10 winds, was that it is good to be on board the new *Cumulus* and a great improvement on the old ship of that name, which has now been sold for scrap.

(Photographs of the new *Cumulus* are opposite page 23)

551.509.21

Sea Areas used in the B.B.C. and G.P.O. Weather Bulletins for Shipping

A recent inquiry from a newspaper office about the origin and history of the names used in the Meteorological Office weather bulletins for shipping suggests that this is a subject likely to be of interest to readers of this journal.

Gale warnings for the British Isles were being broadcast to ships in the Eastern North Atlantic approaching these shores as far back as 1911, but on the outbreak of war in 1914 this service ceased and it was not until 1921 that any regular weather bulletins for shipping could be resumed.

Commencing in June 1921 a specially prepared weather message for shipping approaching the western coasts of the U.K. was broadcast twice a day from the W/T station at Poldhu in Cornwall. This message consisted of the forecast for the Western Coasts in plain language, followed by observations, in code, of barometric pressure, wind direction and force, visibility and barometric tendency taken at 0700 and 1800 GMT at Blacksod, Stornoway, Holyhead, Scilly and Dungeness so that the mariner was given some idea of the conditions upon which the forecast was based.

On 1st January 1924 in appreciation of the valuable help given to the meteorological service of this country by the radio weather reports from ships, a weather bulletin called Weather Shipping was started, broadcast twice daily at 0900 and

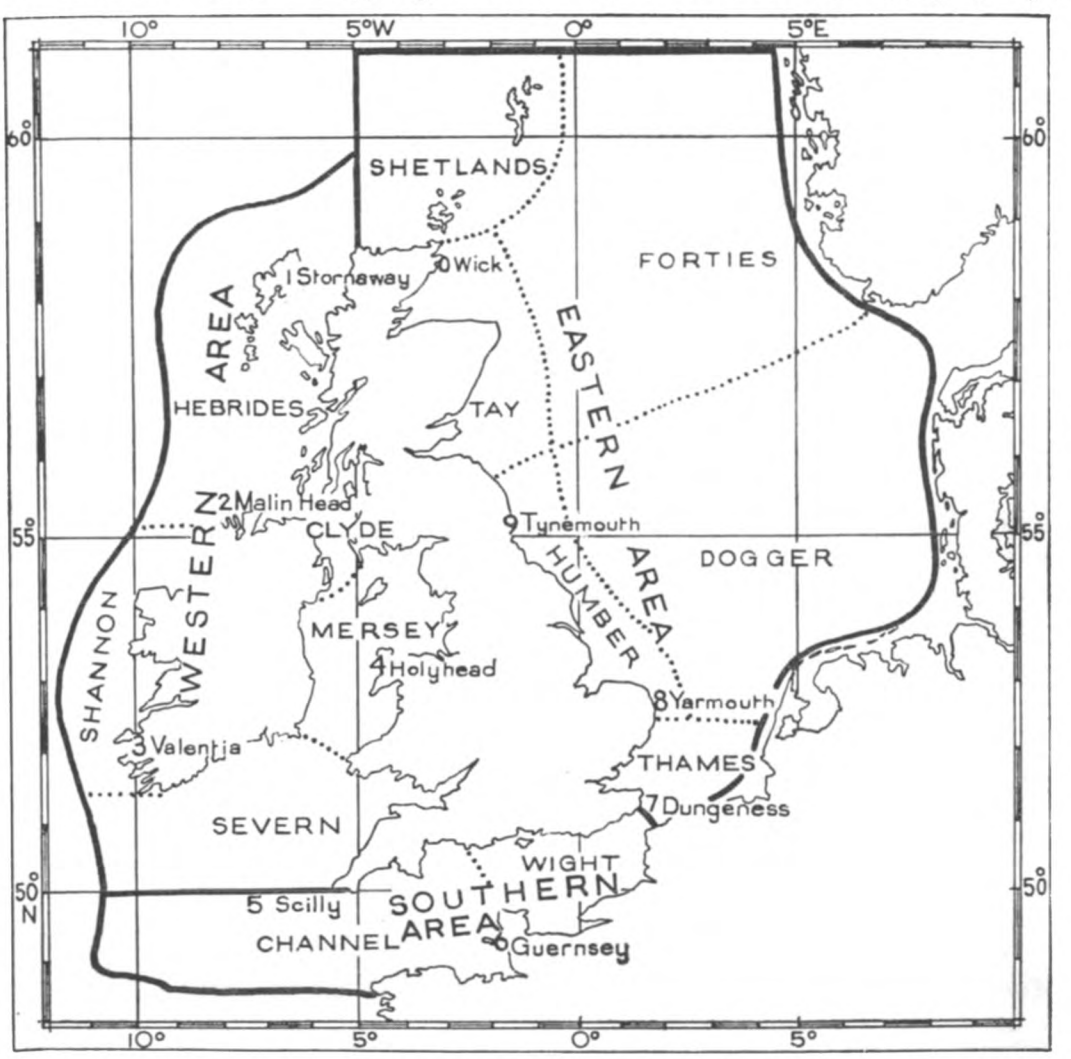


Fig. 1. Sea areas and stations as used originally, in 1924. The numbers before the names of the stations indicate their code number. The boundaries of the area are defined by the plain black lines and the coast line. These areas are sub-divided into districts named after islands, rivers or banks within them so that they may be readily memorised. The same principle in naming of sea areas is still used, i.e. names which at once identify the area to the mariner.

2000 GMT, from the powerful Air Ministry station G.F.A. in London, on a wavelength of 4,100 metres using CW transmission which was capable of being received at a distance of up to 2,400 miles to the westward and some 2,000 miles to the southward. Most large ocean-going ships by this time were fitted for CW W/T reception but there were still quite a number of the smaller ocean-going vessels and some coasters fitted for the reception of Spark transmission only, so that it was not long before pressure was being brought to bear for this bulletin to be broadcast on Spark as well as CW for their benefit. By the end of that year Spark transmissions of the bulletin were made from the coast stations at Valentia and Seaforth for the western area, Niton for the southern area and Cullercoats for the eastern area. The bulletin was in six parts. Part I gave a general inference of weather conditions over the British Isles which usually included information of the pressure systems influencing the weather, and their positions. Part II gave actual observations in code, with station number, barometric pressure and tendency, visibility, direction and force of wind, at the ten British stations shown in Fig. 1, opposite, numbered from 0 to 9. Parts III, IV and V were forecasts of wind and visibility for the 12 hours following the time of observations for the areas shown on the chartlet. Part VI commencing 'outlook' gave a general statement of the expectation of weather after the period of the forecast.

From October 1925 this bulletin, with the exception of Part II—which was in code—was broadcast by telephony from the B.B.C. station 5XX at Daventry twice daily on 1,600 metres. In 1932, a Northern area was added to the shipping bulletins (see Fig. 2 below) mainly for the benefit of the increasing number of trawlers fishing within its limits.

Radio weather bulletins for shipping ceased on the outbreak of hostilities in 1939. They were resumed again in 1945 in much the same form as in 1939.

By 1948 most shipping services had returned to normal and a need was felt for

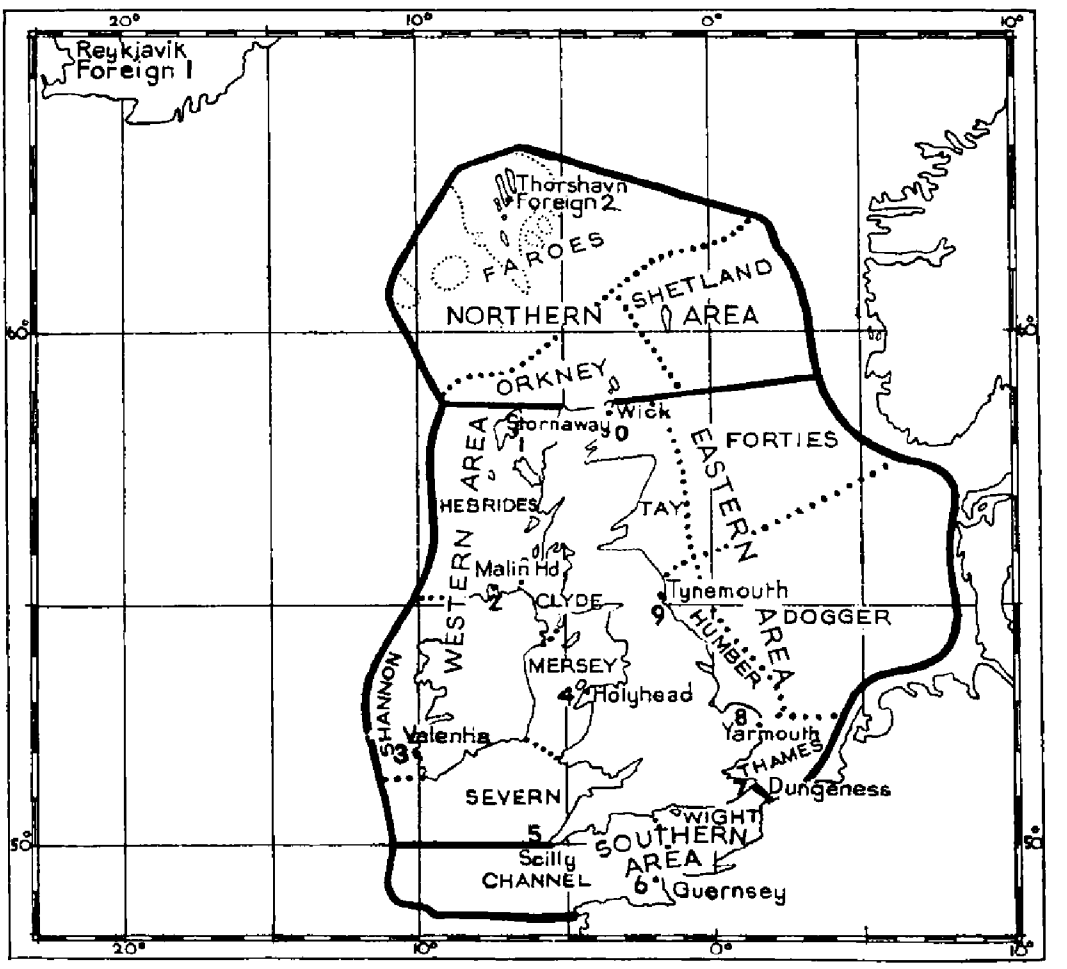


Fig. 2. Sea areas as amended in 1932.

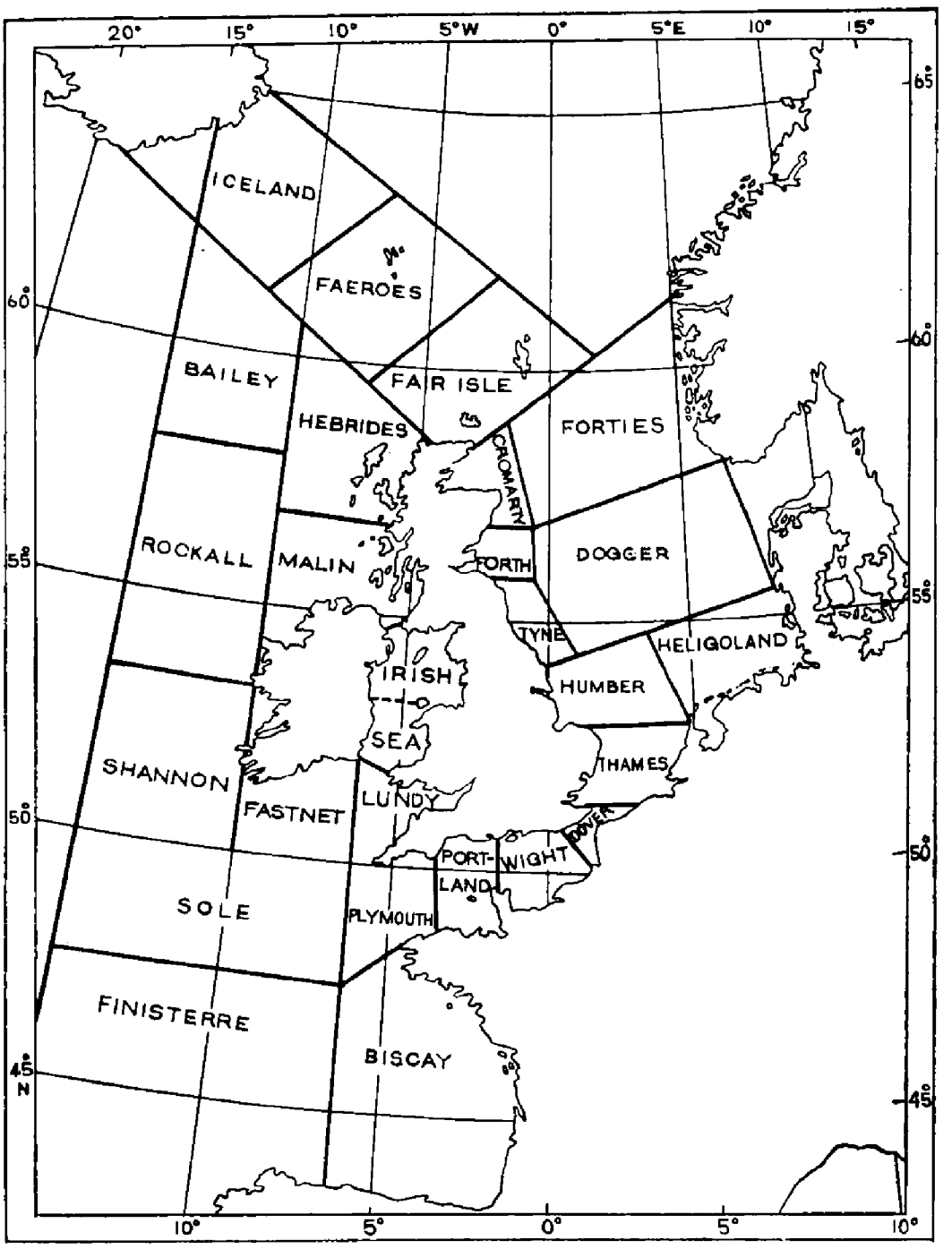


Fig. 3. Sea areas adopted in 1949.

shipping forecasts to cover a wider area. Fig. 3, above, shows the considerable extension of forecasts agreed in that year and introduced in 1949 when the chartlet was given a new format; the northern, southern, eastern and western area divisions shown on previous chartlets were omitted.

In 1955 a meeting of meteorologists representing countries bordering the North Sea recommended that the area then designated 'Heligoland' by the U.K. should be renamed 'German Bight', the name it was generally known by on the other side of the North Sea. Three other changes were also recommended at this meeting. These were that the area Dogger be divided and the NE half named 'Fisher', and that the area Forties be divided and the northern half named 'Viking'. Both these new areas are names of banks within their boundaries well known to mariners. The area then known as Iceland was to be renamed S.E. Iceland to identify clearly its position. After full consultation with the authorities concerned these changes were introduced in 1956 (see Fig. 4, the caption of which explains the naming of the various subdivisions).

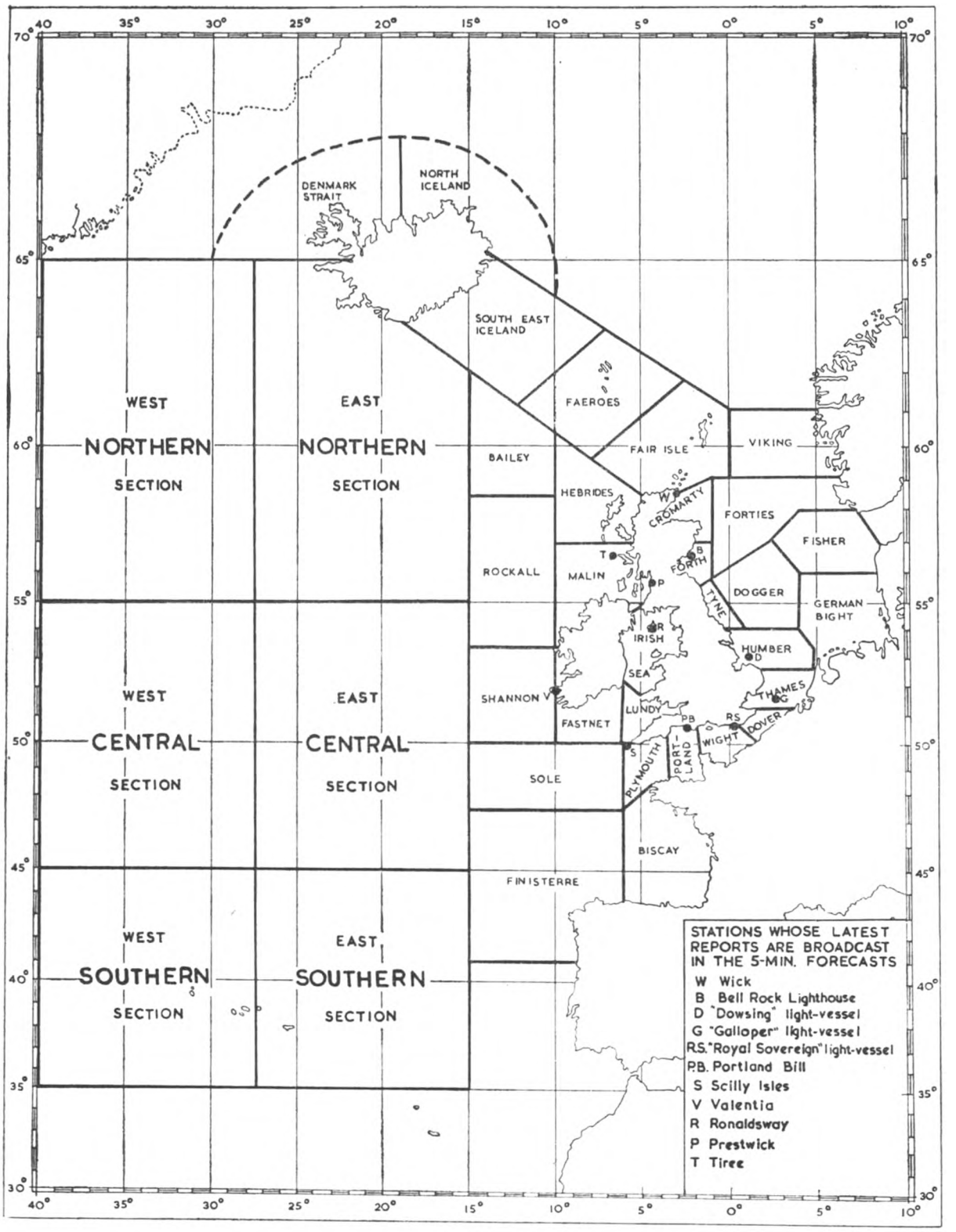


Fig. 4. Present forecast areas. The areas Denmark Strait, North Iceland and the Northern, Central and Southern Sections are used in the North Atlantic Weather Bulletin which is provided for these areas. In all of these maps the forecast subdivisions are named after islands, rivers or banks within them so that they may be easily memorised—i.e. they are names which at once identify the area to the mariner.

The Atlantic Bulletin areas are self-evident.

Thus areas Bailey, Rockall, Sole, Dogger, Fisher, Forties and Viking are named after sand banks within these areas, all clearly shown on navigation charts of these localities, so that to mariners familiar with coastal waters of the U.K. they are immediately located in his mind. The naming of the other areas requires no explaining.

The district boundaries (on Figs. 1 and 2) were only an approximate indication of their extent. Their purpose was for giving information of different weather within an area without unduly lengthening the wording of a message.

The last revision was in 1958 when, because of the great difficulty experienced in forecasting for small areas in the Irish sea, the north/south boundary in this area was dropped.

It is sometimes suggested that it would be helpful to mariners if the present sea areas were sub-divided. The reason this is not done is that shipping forecasts are mainly concerned with wind and visibility, and it is rarely possible to forecast local differences of wind within sea areas the size of those now in use. To reduce their size and add new ones would not necessarily improve their accuracy, and would certainly lengthen the bulletins and so aggravate what is already a problem to the announcers, who in order to complete the bulletin in the time allotted must sometimes read it too fast to suit many listeners who like to write it down. It has so far proved impossible to get any extension in the time allowed for the bulletins.

A. D. W.

551.465.8: 593.14

Discoloured Water due to Zooplankton off Lower California

By T. J. Hart, D.SC.
(National Institute of Oceanography)

For ten years now we at N.I.O. have maintained liaison with the marine division of the Meteorological Office (M.O.1), the oceanographic branch of the Hydrographic Office (Admiralty) and others, for the collection of reports etc. of discoloured water phenomena at sea. Comments on some of these are published in the "Marine Observer's Log", a regular feature of *The Marine Observer*, at the editor's discretion.

It is now fairly generally known that these phenomena are nearly always due to exceptionally dense swarms of planktonic organisms in the water, usually certain species of microscopic algae (plants, phytoplankton). Less commonly they can be caused by slightly larger planktonic animals. Even more rarely similar visual effects may be caused by inorganic particles: wind-borne dust, land run-off after heavy coastal rains, or products of volcanic activity.

A most interesting and exceptional instance of animal (zooplankton) discolouration occurred off southern California in June 1961. I have not commented on this before, partly because the whole ten years' results (1953–1963) are still in process of digestion, and also because British 'selected ships', the reports from which are the prime concern of the "Marine Observer's Log", were not involved.

The reports in question were forwarded by Lt.-Cmdr. D. P. D. Scott, R.N., of the Oceanographic Branch, Hydrographic Office, the Admiralty.

First, the Master of s.s. *Point Aconi*, Cmdr. A. Bicker-Caarten, R.D., R.N.R. Retd., reported as follows, in a letter to the Hydrographer which he very kindly said I might quote:

"On June 1st 1961, while off the coast of Lower California, Mexico, the Chief Engineer reported his main condenser out of action, possibly from small fish. We continued on the auxiliary. At 7 a.m. June 2nd when 10 miles NW of Cape Lazaro the auxiliary also went out of action. The ship was stopped and the condensers were cleared of twelve buckets of small crustaceans, similar to cray fish.

The sea around us had millions more, in fact in the sunlight it was coloured red for miles. On getting under weigh I ran straight for deep water but before reaching it, say some ten miles, I had to clear the condensers twice. On arriving at San Pedro I mentioned this to the Pilot, an ex-Navy man, who informed me he had never heard of such an occurrence off South California."

In 1932 Dr. L. Harrison Matthews, F.R.S., who was then still working for the Discovery Investigations, published an account of 'Lobster-krill',[1] including information received from Capt. S. Fagerli (who had been in charge of whaling operations in Magdalena Bay, Lower California, in 1926) and from Dr. Waldo L. Smitt of the U.S. National Museum, that leaves scarcely any doubt as to the identity of the crustacea that discomfited the s.s. *Point Aconi*; and knowing of this I was able to make the comments which follow, when writing to thank Cmdr. Bicker-Caarten.

"The phenomenon is known to occur with some frequency in Magdalena Bay and environs, but rarely if ever on such a vast scale as that which you must have encountered. The crustaceans are the pelagic post-larvae of *Pleuroncodes planipes Stimpson*, closely related to two species of another genus, *Munida*, that occur in Patagonian and New Zealand waters. There was a good note on the subject in early editions of the Mexico and Central American Coast Pilot, published by the U.S. Hydrographic Office. These swarming crustacea are an important food of whales, sea-birds and fishes in the regions mentioned, and the New Zealand ones are called 'whale-feed' locally. . . . I have heard of condenser intakes being choked by plankton before—by swarms of salps and of large jelly-fish—but not hitherto by crustacea."

Cmdr. Bicker-Caarten's experience was shared by a ship of different nationality that passed through the same area a fortnight later. In U.S.N.M.28/61 we read that 2/O. J. E. Merson of the Panamanian s.s. *Carl Schmedeman*, Capt. J. A. Scott, Master, reported:

"At 0400 GMT June 15th, 1961, in Lat. 22° 45'N; 110° 15'W, on passage from San Pedro, California, to Balboa, Canal Zone, course 127°, speed 16 knots, the vessel passed through an extensive field of small shrimp which choked the main condenser and eventually necessitated stopping the ship for several hours to clean out. More than 23 gallons of shrimp were removed from the condenser. The majority of the shrimp were about 1½ in. long."

One is tempted to suggest that a rider should be added to the sailing directions, advising coastwise shipping thereabouts to keep twelve miles offshore, to avoid possible condenser trouble during May and June! But seriously, there is little doubt that this was an exceptionally heavy and extensive swarming, and that the dense shoals of this 'shrimp' are normally smaller and farther inshore.

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551.46.062.7(261):551.46.07(261)

INTERNATIONAL ICE PATROL, 1963

This article which was provided by the Commander, International Ice Patrol, includes material summarised in our quarterly ice articles, but we are glad to have this authentic account, with local and operational details.

In 1963, for the forty-fourth year since 1913, the International Ice Patrol was conducted on the North Atlantic Ocean in the vicinity of the Grand Banks of Newfoundland by the U.S. Coast Guard. Full services of the International Ice Patrol were provided from 6th March to 21st June. Ice observation was made by aircraft from 13th January to 23rd July. An estimated 25 bergs drifted south of 48°N during the year as compared to the annual average of 392 bergs since 1900; 1963 was thus a very light iceberg year.

Operating forces assigned to the Commander, International Ice Patrol, included the U.S. Coast Guard Air Detachment, Argentia, Newfoundland; U.S. Coast Guard Radio Station NIK, Argentia; U.S. Coast Guard Cutters *Evergreen* (oceanographic vessel), *Acushnet* and *Tamoroa* (standby patrol vessels). The *Tamoroa* was relieved as standby patrol vessel in March by the *Chilula* and *Cherokee* respectively; however, for the fourth successive season and the twelfth of the last 14 seasons the standby patrol vessels were not required.

The primary source of ice information was from planned aerial reconnaissance. A secondary and indispensable source of ice information consisted of reports from merchant and government vessels of various nationalities. The Canadian Department of Transport Ice Forecast Office, Halifax, Nova Scotia and the U.S. Navy also furnished valuable ice information.

For the first time aerial reconnaissance flights were made rather far north along the Labrador coast and across Hudson Strait to Frobisher Bay on Baffin Island to determine the Grand Banks iceberg potential for the coming ice season. These flights on 13th–14th January and 13th–14th March indicated a very light iceberg year, and provided valuable information about the drift and deterioration of bergs.

Commander, International Ice Patrol, and his staff moved to U.S. Naval Station, Argentia, Newfoundland, on 4th March and commenced providing full services on 6th March, including aerial reconnaissance, twice daily broadcasts to shipping by

NIK and the transmission of twice daily ice bulletins to Washington, D.C., and others for further dissemination. At this time young sea ice had just invaded the northern Grand Banks to an eastern limit of 48°W and southern limit of 47°10'N. There were no known bergs south of 49°N and only a few estimated further north as far as Hamilton Inlet. Throughout March strong north-westerly circulation with colder than normal temperatures dominated the area, maintaining rather constant sea ice limits and driving the few bergs from along the Labrador Coast towards the Grand Banks at about 20 miles per day. It was fortunate that the supply of bergs was so limited for if there had been the usual or average amount between the Grand Banks and Labrador Coast at this time of year, an extensive berg threat would have developed on the Grand Banks and vicinity especially with the existing below-normal surface water temperatures.

On 13th and 14th March there were about 50 bergs south of Hamilton Inlet; these began arriving on the northern Grand Banks about the 20th and continued intermittently until mid-April.

The weather pattern abruptly changed in April with onshore north-easterly winds predominating over the entire area from the northern Grand Banks well up the Labrador Coast. The type of iceberg season for the Grand Banks was now quite well identified. An estimated fifteen stragglers, which had arrived off the Newfoundland Coast just north of the Grand Banks about 10th April were driven aground along the coast or into the bays from Fogo Island to Cape Broyle. These lasted much longer in the colder coastal waters than those which had been driven out to sea shortly before. It now appeared that the main threat to the major trans-Atlantic shipping lanes for 1963 existed in the form of the one large and six medium-sized bergs. The large one had drifted to near 46°N, 48°W by 21st April where it grounded for a couple of days. By now, though still large, it was badly eroded with three distinct pinnacles and one column all separated at the water surface. Three days later the large berg had disintegrated into four small ones, which were sighted 50 miles to the south-east. These small bergs now out of the Labrador Current drifted aimlessly in the area and deteriorated within 10 days without achieving any drift south of 45°N. The six medium-sized bergs were driven by predominately north to north-easterly winds onto the north-east Banks where they grounded and slowly disintegrated in average water temperatures of about 34°F. By 15th May, except for a couple of bergs close along Avalon Peninsula, the Grand Banks were ice free at this time and expected to remain so until June.

The onshore winds in the area north of the Grand Banks continued through the first week of May, but then shifted to the west-south-west and so remained until the end of May. By 10th May, many bergs were reported arriving near Belle Isle. At this time there were about 325 bergs well spread out from just south of Belle Isle to 55°40'N between the coast and 50°W. In spite of average northerly winds during the first half of June only a handful were able to drift into the vicinity of the northern Grand Banks, with a minor threat to 'lane route F' in late June and early July. By mid-July there were no known bergs remaining south of 50°N.

The limits of sea ice (i.e. field ice) on the northern Grand Banks in March were fairly static with the young ice mostly brash and small floes due to heavy sea conditions quickly disintegrating as it drifted out to sea into waters warmer than 32°F. This deterioration was almost matched by the supply provided by the west-north-west winds and east-flowing Labrador Current. By mid-April the sea-ice limits had retreated to just north of the north-west Grand Banks near Cape Bonavista. By the end of April the Grand Banks were free of all sea-ice with limits to the north of Cape Freels close along the coasts of Newfoundland and Labrador. By 19th May Belle Isle Strait was considered navigable and by 24th May the Strait and approaches from east were open water. This is a month ahead of the average opening date. St. John's, Newfoundland, was open to navigation throughout the ice season.

The Gulf of St. Lawrence including Cabot Strait and the North-east Arm experienced a relatively light ice year while the steamer track from Cape Ray into the

St. Lawrence River was declared navigable on 29th March. Aerial reconnaissance and dissemination of ice information in this area is performed by the Canadian Department of Transport annually from January to June. Ships approaching Cabot Strait during this period should contact Canadian Ice Information Officer, Sydney (VCO).

Annually after termination of the International Ice Patrol and until commencement the following year, ships are requested to transmit ice reports to the U.S. Naval Oceanographic Office, Washington, D.C., for further dissemination. U.S. Coast Guard Radio Station (NJN), Argentia, will be available for relay of ice reports and also for transmission of safety broadcasts when unseasonable ice threatens shipping lanes near the Grand Banks. A permanent nucleus of the International Ice Patrol Office will perform ice observation as advisable after ice patrol terminates and prior to commencement the next year. A plot of ice reports on the Grand Banks and vicinity will be maintained year round and ship requests for ice information will be answered via NJN.

In addition to ice reports, all ships are urged to make regular four-hourly reports to Radio Station NIK during the ice season when between latitude 39°N and 49°N and longitude 42°W and 60°W, including ship's position, course, speed, visibility, sea temperature and weather condition. The visibility reports are of value in planning ice observation flights; and are useful in deciding whether or not special warnings on ice conditions should be broadcast. Sea temperatures are used for estimating ice deterioration and detecting shifts in the branches of the Labrador Current. Wind data are needed for estimating set and drift of ice and for planning ice observation flights. An up-to-date plot is maintained for all reporting ships. These ships can be warned directly when approaching dangerous ice. When reporting icebergs, ships are requested to include the shape and estimate of size; this helps to identify and track individual bergs.

The International Ice Patrol will once again commence full services about 1st March 1964, depending on ice conditions at the time. Ice bulletins will be broadcast twice daily, at 0048 and 1248 GMT, by U.S. Coast Guard Radio Argentia (NIK) on 155, 5320 and 8502 kcs. Each broadcast will be preceded by the general call CQ on 500 kcs. with instructions to shift to receive on 155, 5320 and 8502 kcs. After shifting to these frequencies, NIK will transmit test signals and the International Ice Patrol radio call sign NIK for about two minutes to facilitate tuning. Transmission of the bulletin will then follow immediately at 15 words per minute and repeated at 25 words per minute. Prescribed radio silent periods will be observed. The ice bulletin will generally include the limits of all known ice, the areas and limits of heavy concentrations, and the positions of individual bergs and growlers between the limits and heavy concentrations. The ice conditions broadcast will be as observed or reported during the date of the broadcast or estimated up to the broadcast time.

Ice conditions will be transmitted daily by facsimile at 1330Z on 5320 and 8502 kcs. at a drum speed of 60 RPM. Ice charts were broadcast by facsimile successfully during the 1963 ice season as a regular daily service. Indications are that several ships with facsimile receivers copied Ice Patrol Charts with ranges as far as the United States east coast and 1200 miles east of Newfoundland. Ships are encouraged to install facsimile receivers. The ice information is more reliable as human transmission and reception errors are eliminated and considerably more information can be transmitted by facsimile as compared to CW in a given amount of time.

Duplex operation will be used between NIK and merchant ships. Ships may call NIK on 500 kcs. and 8 mc. maritime calling band at any time; also 12 mc. band during daylight hours (shifting to 425, 448, 454, 468 or 480 kcs. or assigned working frequency). NIK will work 427 kcs. 8734 kcs., 6477·5 kcs. or 12718·5 kcs. The surface patrol vessel, radio call sign NIDK, when on station will relay between NIK and ships when necessary. There is no charge for these services.

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NOTES ON ICE CONDITIONS IN AREAS ADJACENT TO THE NORTH ATLANTIC OCEAN—JULY TO SEPTEMBER 1963

Relevant Weather Factors

July. During most of the month depressions moved from the south of Greenland towards Scandinavia on into the Russian Arctic. Pressure on average was 2 mb. above normal over Europe and the North Pacific, 5 mb. over Greenland and 2½ mb. below normal over Alaska and 5 mb. over the Russian Arctic. Air masses over the Polar Basin and North Atlantic were slightly cooler than normal. Precipitation was slightly above normal on the Russian side of the Arctic. Sea surface temperatures were more than 2°C above normal south-west of Spitzbergen and between Greenland and Labrador. However, much of the water of the North Atlantic appears to have been cooler than normal at the surface.

August. There was a high level of depression activity generally over the North Atlantic and Canadian Arctic. Temperatures were on average 2°C below normal over the Bering Straits and North Canada and 2°C above normal over Baffin Bay, Greenland and Spitzbergen. Warm air was advected into the Polar Basin across this area. Precipitation was slightly above normal over North Canada and northern Russia. Most of the surface sea water of the North Atlantic was cooler than normal but parts of the Barents Sea continued warmer than normal.

September. There was a very high level of depression activity all around the northern hemisphere between 50° and 60°N over the North Pacific Ocean, across northern Canada to the south of Greenland, and thence north-eastwards to the Russian Arctic. Towards the end of the month there was a high level of depression activity in the Polar Basin. Pressure was very much below normal over Greenland, Baffin Bay and Iceland and the cooling of the Canadian side of the Arctic was more extensive than that on the Russian side. Sea surface temperatures in the North Altantic Ocean in Davis Strait and the Barents Sea were several degrees Celsius below normal.

Canadian Arctic Archipelago including Baffin Bay, Hudson Bay and Hudson Strait

July. The extent of open water in the Beaufort Sea and Amundson Gulf continued to increase but the area and mass of pack-ice in the remainder of the Canadian Arctic was well above normal. Supply ships experienced their worst ever passages. Extensive concentrations of close pack-ice in Foxe Basin, the south-west quarter of Hudson Bay, and the north-east coast of Baffin Island have been clearing very slowly. (Ice-breakers *Labrador* and *N. B. MacLean* arrived in Hudson Strait on 23rd July. They found it clogged with ice and took two weeks to clear the route through to Churchill.) Arctic water and pack-ice appeared to have moved extensively from the Polar Basin through Kane Basin.

August. The area of open water in the Beaufort Sea increased and large areas of open water formed south of Victoria Island. Much heavy but puddled field ice remained in the north-east parts of the Archipelago. A great amount of broken winter ice remained in Foxe Basin but Hudson Bay and Hudson Strait were clear of pack-ice at the end of the month. The ice situation was largely normal at the end of August. Travellers in the early part of the month got the impression of a much heavier than normal amount of ice in the far north-west of Baffin Bay, e.g. towards Pond Inlet. Canadian ice-breakers and transports reported unprecedentedly severe conditions in Lancaster Sound and off Cornwallis Island.

September. There was no material change in the heavier pack-ice over most of the Archipelago but by the end of the month widespread new ice was forming among the islands. Sea areas between the Polar Basin and Smith Sound were full of Arctic pack-ice which was moving extensively southwards towards Devon Island. Only ice-breakers could move in this area of very heavy pack. Foxe Basin became clear of ice for a short period of this month and there was little change in Hudson Bay and Hudson Strait. Most of Baffin Bay became clear of pack-ice although numerous icebergs circulated in the Bay north of 70°N. So far no large concentrations of icebergs have been reported apart from those off the Greenland glaciers.

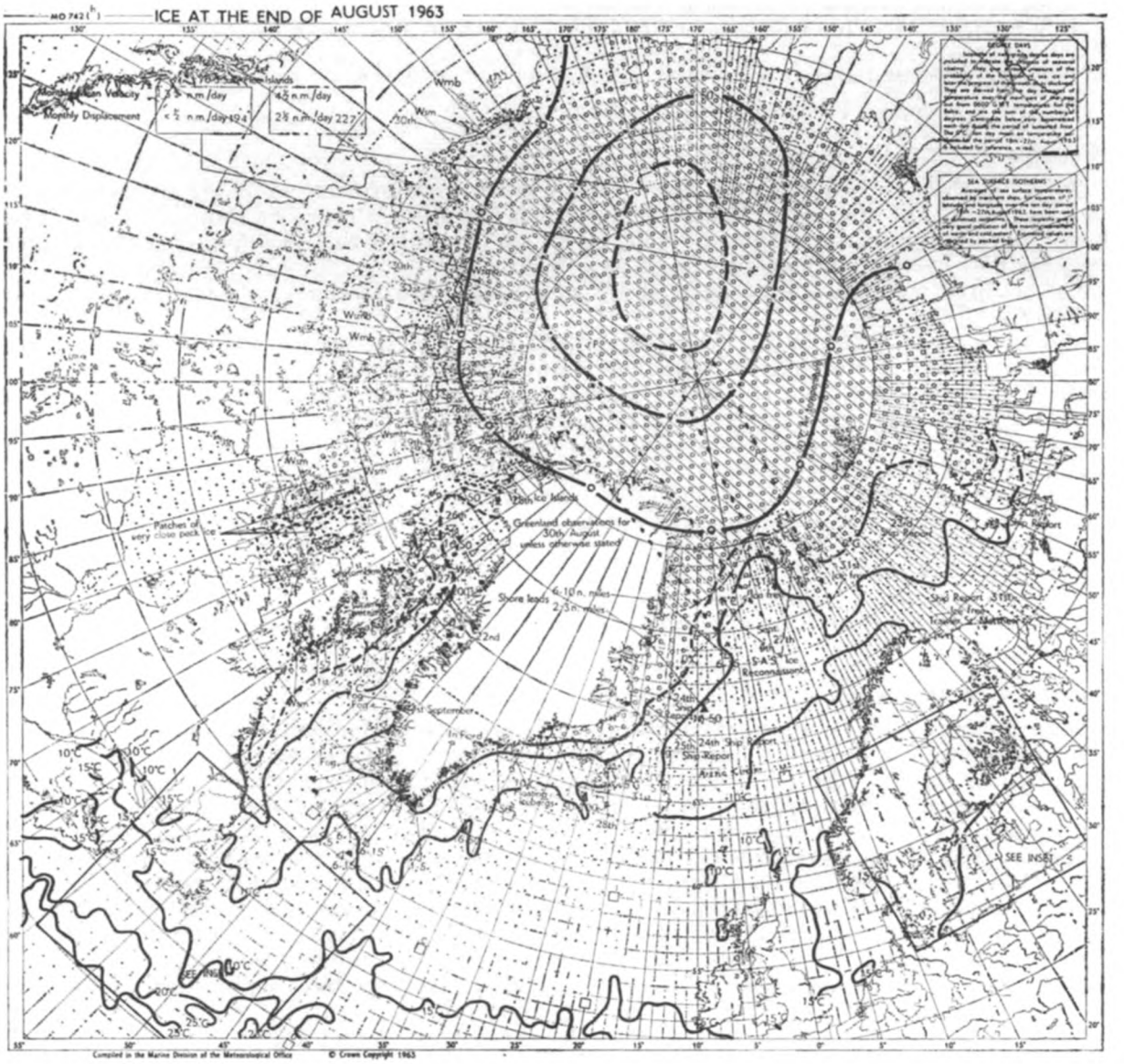
Davis Strait and Labrador Sea

July. At the end of the month isolated icebergs and growlers were moving southwards along the Labrador coast. There was no pack-ice on this coast but a large mass of heavy pack off Baffin Island to the north of Resolution Island caused serious navigation difficulties to supply ships moving northwards.

There was a very unusual mass of open pack-ice extending fifty miles westwards from the west coast of Greenland north to Cape Farewell. It extended out to 61½°N 50½°W. Up to fifty icebergs were reported by ships and individual land stations off this coast from Cape Farewell to 70°N. An individual land station reported more than 200 icebergs off Disko Island.

August. There were the normal seasonal developments in the ice during this month. The large mass of heavy pack-ice off Baffin Island between 66° and 69°N was decreasing rapidly at the end of the month. This mass appeared to have impeded the southward flow of the Arctic water of the Labrador current which, from the number and movement of icebergs to the south, appeared to be abnormally weak.

September. There were few changes during this month but the ice off Baffin Island was breaking up. This resulted in increasing numbers of icebergs moving southwards along the Labrador coast and towards the north of the Great Bank.


MO 742 (b)
ICE AT THE END OF AUGUST 1963
Monthly Displacement
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GRAND BANK AND EAST NEWFOUNDLAND COAST

July to September. Ice free except for a few icebergs in July north of 48°N.

RIVER ST. LAWRENCE, THE GULF OF ST. LAWRENCE AND GREAT LAKES

July to September. These areas were ice free.

GREENLAND SEA

July. North of Scoresby Sound there was a general westward retreat of the Arctic pack off eastern Greenland but some coastal stations north of 74°N continued to report fast ice. The west coast of Spitzbergen remained ice free but at the end of the month open pack-ice and icebergs had moved southwestwards to Bear Island.

Up to fifty icebergs were reported by individual land stations off eastern Greenland within the polar pack-ice.

August. Coastal stations of eastern Greenland were free of fast ice and there were many shore leads at the end of August. The thaw, however, came late. The area of Arctic and polar pack off this coast although still above normal continued to decrease; its southerly limit was at 75°N. There was little change in the number of icebergs. Sea surface temperatures east of the pack-ice (i.e. south-west of Spitzbergen) increased to 3°C. The warmer Atlantic water appeared to be advancing northwards west of Spitzbergen and displacing Arctic water.

September. Fast ice developed along the coast of eastern Greenland north of 75°N and the area of polar pack increased generally north of 70°N. A narrow belt of close polar pack-ice extended southwards along the coast to 70°N. The amount of open and very open pack beyond the area of close polar pack increased slightly approaching the north coast of Iceland. Almost all types of pack-ice continued in excess of normal.

Spitzbergen and Bear Island were free of ice and open water was reported north of Spitzbergen.

DENMARK STRAIT

July. Atlantic water continued to fill most of the Strait. Small amounts of pack-ice only remained south of the Arctic Circle but the number of icebergs increased and at the end of the month 50 to 100 icebergs were reported at Aputiteq moving south-westwards in the pack-ice. Off the Greenland coast north-west of Iceland the large area of pack-ice containing icebergs appeared to be gradually disappearing.

August. The warm Atlantic water continued to occupy most of the Strait and the field ice off the Greenland coast almost disappeared south of the Arctic Circle. The extensive area of pack-ice off the Greenland coast north-west of Iceland again increased almost filling the Strait. This was the result of the normal drift of Arctic pack out of the Polar Basin from the north and the very restricted East Greenland current south of Scoresby Sound.

The iceberg population remained high and up to 100 icebergs were reported by individual land stations; some icebergs were reported ten miles off the coast.

September. Very little change except that the iceberg population decreased.

Table 1. Icebergs sighted by merchant ships in the North Atlantic

(*This does not include growlers or radar targets*)

Limits of Latitude and Longitude		Degrees North and West					
		56	54	52	50	48	46
Number of bergs reported south of limit	July	*	*	115	57	0	0
	August	*	0	0	0	0	0
	September	*	2	0	0	0	0
	Total	*	*	115	57	0	0
Number of bergs reported east of limit	July	112	65	45	27	8	0
	August	0	0	0	0	0	0
	September	2	2	2	0	0	0
	Total	114	67	47	27	8	0
Extreme southern limit	July	48° 05′N, 48° 05′W on 5.7.63					
	August						
	September	52° 32′N, 50° 22′W on 27.9.63					
Extreme eastern limit	July	49° 15′N, 46° 20′W on 5.7.63					
	August						
	September	52° 32′N, 50° 22′W on 27.9.63					

* Icebergs known to exist, but total unknown.

BARENTS SEA

July. This area was mainly normal. Sea surface temperatures in the south-west were 1°C above normal and polar pack in the north-west appeared to be moving southwards extensively east of Spitzbergen.

August. Very little change.

September. There was a seasonal increase in the arctic and polar ice from the north-east. The movement of icebergs and climatic data suggests that the polar pack continued to move southwards east of Spitzbergen.

G. A. T.

A REPLY TO MANY LETTERS

We have been pleased to read the many letters that have been received from the Captains, Principal Observing Officers and Radio Officers who won Excellent Awards last year. In replying to our request for an address to which we could send their award, many people have expressed pleasure (and some even surprise!) to hear that their ship is among those to gain an award. It is good to read of the interest that is taken in meteorological observing. One captain says "My officers will be very pleased to learn of this award as they have always shown great enthusiasm and interest in their meteorological work". A captain who has retired since gaining his award writes, "One thing I miss above all else is the Met. work which I always found so fascinating and full of interest". Some officers were obviously newcomers to the meteorological work as one wrote "I was pleasantly surprised to find that compiling Meteorological data could become so absorbing", and a Radio Officer says, "It was entirely due to the Master of this vessel that I became interested in Met. reporting and also for ensuring that my first weather messages were accurate enough for your requirements". In a number of letters, the assistance of other officers (who, unfortunately, couldn't all have awards) was stressed; as an Observing Officer said, "Without the help of the Second and Fourth Mates I would have found it impossible to do so well", and a Radio Officer also wrote, "Had it not been for the co-operation of my second Radio Officer, the ship would not have been in a position to receive the awards". Another Observing Officer finds that observing duties help to pass the long Atlantic sea watches, and the awareness that these duties are done for an excellent cause makes them even more commendable. Other officers are glad to know that their efforts are appreciated; "It has been a matter of great satisfaction to have played a small part in such an important service", a Radio Officer writes. Another officer says that it is most gratifying to discover that his Meteorological records were considered useful, and he trusts that he will be able to compile more useful data. "I sincerely hope that I may continue to play my small part in making up the North Atlantic weather charts for many years to come", says another letter. In the Meteorological Office here, we thank all the writers of these letters, and everyone who helps to keep the supply of observations coming in—ship reports supply a vital part of our information about the weather situation over the large proportion of the earth's surface that is water.

C. E. A.

Book Reviews

Stowage. The Properties and Stowage of Cargoes, by Captain R. E. Thomas. 5th edition, revised and enlarged by Captain O. O. Thomas. 9 in. × 6½ in. pp. 530. *Illus.* Brown Son & Ferguson Ltd., Glasgow, 1963. 65*s*.

Thomas's *Stowage* needs no introduction to the cargo ship's officer for it has been the standard work on the subject for thirty-five years. Five editions in that time is sufficient indication that it is accepted as an integral part of the technical literature of the profession of the sea.

The basic principles of good stowage never vary but a book of this nature requires frequent revision in order that new commodities and new methods may be incorporated. The ultimate responsibility for the safe and satisfactory carriage of any

cargo still rests with the master of a ship and it might be well if every ship's officer could have access to this book if not actually to possess his own copy.

The present edition is, as were its predecessors, divided into three parts. Part I of 65 pages discusses, under appropriate headings, all the aspects of loading, stowage, carriage and discharge of cargoes. It is this section which appears to have undergone the greatest revision, for in thirty-five years many new techniques have grown up, whilst increasing costs of handling and packaging have given rise to much research in this direction. Among this research is the not inconsiderable attention which we in the Meteorological Office have paid to the problem of the ventilation of cargo and the meteorological aspects of cargo handling. In a lengthy discourse under the heading 'Ventilation of Cargo', Captain Thomas has quoted from one of our papers on this subject which was published in the October 1954 number of *The Marine Observer* emphasising our advice that "no system of ventilation can prevent damage if the ships officers do not know when to and when not to use it".

Part II is an alphabetical list of the principal commodities, giving their stowage factor, style of package, remarks as to countries of origin, their properties and characteristics etc. This list differs little from that in the first edition, which the reviewer was brought up on, although its alphabetical scope is now from Abalone to Zirconium Ore whereas the first edition merely went from Alabaster to Zinc White. Amongst the additional material in this section is some helpful advice on the transport of wild animals, whilst the atomic age has its place under the entry Radio-Active Materials.

Part III deals with Refrigerated Cargoes and here again is an alphabetical list of such cargoes, their stowage factors and methods of carriage, paying particular attention to dunnaging.

Part IV, the Appendix, gives the text of many regulations, both national and international, which are currently in force for the carriage of goods by sea, ranging from the Harter Act (U.S.A.) of 1893 to those drawn up by the International Convention for the Safety of Life at Sea 1960. The rules concerning the carriage of Dangerous Goods through the Suez and Panama Canals have, however, been omitted from this edition because, the author states, their frequent modification, addition or revocation make it no longer expedient or advisable to include them. If this is his reason for omitting also the British Regulations on Dangerous Cargoes (to which no fewer than 42 pages were devoted in the first edition) the fact is not made clear.

This is an essential book for all cargo ships' officers to have by them, its price may cause many to hesitate but nevertheless many a sixty-five shillings has been invested less wisely.

L. B. P.

Standard Encyclopedia of the World's Oceans and Islands, edited by Anthony Huxley. 9¼ in. by 7½ in. pp. 383. *Illus.* Weidenfeld and Nicolson. London, 1963. 45*s*.

Edited by Anthony Huxley—a son of Sir Julian Huxley—the frontispiece gives the names of no less than 30 other contributors to its contents. The publishers tell us that this *Standard Encyclopedia* is a "practical reference volume of great value to the student, geographer, traveller and everyone who has been captivated by the epic world that oceans and islands have played in the history of man". From the viewpoint of the student and others who seek authenticity, it is a pity that neither the editor nor the publishers tells us anything about the contributors or how much they contributed. Exhaustive searches reveal that they include at least one geographer and geologist, an administrator with much practical experience of islands in various parts of the world, a well-known yachtsman and an author.

The introduction reminds us that water covers some two-thirds of the globe and that in this volume are described "the major oceans, seas and islands, bays and straits, currents and depths, capes and coasts." This is a very ambitious project

and it is not surprising that the book lays itself open to some criticisms, particularly in the description of the oceans. The Atlantic Ocean, for example, is described in two and half paragraphs and includes the statement that "today the trade wind routes are almost deserted" and the inference that tropical storms can occur anywhere in the "western half of the Atlantic". The description of the Indian Ocean (one and half paragraphs) is cleverly condensed and particularly accurate; the Pacific occupies about four paragraphs, but the text mostly concentrates on the islands and says little about meteorology or oceanography of the ocean itself. The Gulf Stream, Kuroshio and equatorial currents are picked out for special mention and are each given a paragraph to themselves. Curiously enough the "Gulf Stream counter current—a counter current below the level of the Gulf Stream" is also given a paragraph to itself. In the description of the Gulf Stream it is stated that "one of the most interesting areas of the Stream is to be found in the Atlantic north of the Bermudas, where the Sargasso with its mysterious weed occurs" and that off the Florida coast "the sudden Gulf Stream thunderstorms sparkle like fireworks." In a description of the English Channel, we are told that "the tides owe their origin to the gravitational pull of the moon on the large expanse of the Atlantic Ocean"—as though this were a phenomenon peculiar to that Ocean—and that the relative importance of easterly or westerly winds in the Channel is "now largely unknown to sailors of the steam and diesel age!". It is also stated that "when the southwest cone is hoisted on the Cornish coast and the maroons go off to summon the lifeboats even . . . the *Queen Mary* or the *United States* delay their sailing" and that "Channel fogs . . . are commonest in winter". In the description of the Gulf of Guinea, it is stated that "destructive hurricanes were frequent throughout the year". These errors in fact and terminology would be fairly easily remedied by careful editing and some rearrangement of the paragraphs about oceans, seas and currents would probably be advantageous.

An introductory chapter entitled "Land and Sea" outlines the evolution of seas and land masses and the formation of islands, tells something about submarine topography and the nature of the oceans and shows how the position of the seas has affected animal and vegetable development on islands and continents.

When the authors step ashore to describe the islands they are more at home than they were in the oceans and a very good job they make of it. About 300 islands are covered, including the British Isles, and ranging in size from Greenland (the largest island in the world) to Pitcairn Island, which is one of the smallest described. In most cases the geology, climate and history of the island are discussed and information is given about its inhabitants and its flora and fauna. Judging by the descriptions of islands with which the reviewer is familiar, the book is accurate and informative in this respect. For example, we read that the Barbadians have "a dialect that has something in common with the intonation of the English West Country". A rather surprising omission from the islands is Fernando Naronha—not very prominent commercially or as a tourist centre but a very familiar landmark to shipping on the South American trade.

In addition to islands, certain obvious features connected with the sea—e.g. Cape Horn, Corinth, Panama and Suez Canals and Sydney Harbour are described.

The book is profusely illustrated with excellent polychrome photos and colour plates and there is a useful gazetter at the end and an index.

The maps at the beginning of the book are a bit disappointing—but adequate for the purpose. They are all on Mercator's projection and conveniently gridded and are primarily intended for showing the location of the various islands and oceans discussed. The main contours of the ocean bed are roughly indicated and an inadequate number of arrows show four surface and one subsurface ocean currents.

The defects of this book are not very serious and it makes pleasurable reading, even if it only brings before the reader a brief picture of islands remote from the noise and bustle and mechanisation of civilisation. It may help the tourist industry.

C. E. N. F.

Racing Sailormen, by F. S. Cooper. 10 in. × 7¾ in. pp. 110. *Illus.* Percival Marshall & Co. London, 1963. 17*s.* 6*d.*

The racing sailormen who form the subject of this book are the Thames racing barges and their crews. The author is a member of a family whose connections with 'sailormen' go back at least four generations, and he is still actively interested in sailing barges, and at the present time is believed to be skipper of a motor barge—or to use his own description of the job, a marine lorry driver; a rather less demanding and active life than that of skipper of a Thames sailing barge.

It is fitting that in this centenary year of the annual Thames sailing barge race this book should be published, written by someone so knowledgeable on the subject, particularly as this event is to be discontinued because of rising costs.

The book contains some splendid photographs of racing barges showing their paces and gives some interesting details of many of these graceful vessels and the personalities of those who skippered them who were frequently also their owners. To many Thames estuary yachtsmen who have admired barges racing under full sail, and to those closely acquainted with these vessels, their owners and crews, the twelve chapters and six appendices of this book will no doubt provide enjoyable reading. To others whose knowledge of 'racing sailormen', if any, is probably like the reviewer's, limited to admiring them in passing from the deck of a deep water steamship, the book contains too many statistics to have very much appeal.

A. D. W.

Personalities

OBITUARY.—We record with deep regret the death of CAPTAIN JAMES NORMAN RAMSAY, senior Master of the Bristol City Line, who died suddenly at his home in Bristol while on leave from his ship, the *Bristol City*. He was 59 years of age. Captain Ramsay served the Bristol City Line throughout almost the whole of his sea-going career. He first went to sea as an Apprentice in May 1920, obtained his certificates of Competency and after serving as an officer aboard various of the company's ships was appointed to his first command, the old *New York City*, in September 1935. Apart from a period of eighteen months in 1936–37 when he served in the Port of Bristol dredging service, he continued in command of Bristol City Line ships until the day of his death, his last command being the flagship of the fleet, the *Bristol City*. He was a seaman of outstanding qualities who will be sadly missed by his many friends in the Bristol area. He sailed throughout the last war in command of ships and in June 1953 was awarded the Coronation Medal in recognition of his services to his country. His younger son is following in his father's footsteps; he served his apprenticeship in the Bristol City Line, and is at present an officer with the Shaw Savill Line.

Captain Ramsay's association with the Meteorological Office commenced in 1957 when the *Birmingham City* became a Voluntary observing ship under his command, since then twelve completed logbooks have been received bearing his name, all of which have been classed as 'excellent'. He has received an Excellent Award in 1958, 1960 and 1961 for the outstanding quality of the meteorological work carried out aboard ships under his command.

We offer our sincere condolences to his widow and four children at this sudden bereavement.

F. G. C. J.

OBITUARY.—We regret to record the death on 19th September of LIEUT.-CMDR. F. ROBINSON, R.N.R. at the age of 69.

Since 1955 Cmdr. Robinson had been a Port Relief Officer at the Ocean Weather Ship Base, Greenock, where he was held in high esteem by all who knew and worked with him.

He served his apprenticeship with Thomas Wilson and Co. of Hull, now the

Ellerman Wilson Line, passing for 2nd mate in 1915. He spent a short period as an officer with Wilsons and then joined the New Zealand Shipping Co. Between 1918 and 1922 he served in the Leyland Line and the Australian Commonwealth Co. Then followed a period of 3 years' service as an A.B. in the barque *Garthneill* and in a barque of Peruvian registry (name unknown) to gain experience in sail, after which he obtained a Master's (square-rig) certificate of competency. In 1925 he passed for Extra-Master (square-rig) and then joined the Cunard Line where he served until he came ashore in 1929 to take up an appointment as a lecturer in the Navigation Department of the Watt Memorial College at Greenock, subsequently becoming head of the department.

As an R.N.R. officer he was mobilised on the outbreak of war in 1939 and held various shore appointments in the Royal Navy until demobilised in 1946 when he returned to the Watt Memorial College.

In 1948 he was appointed Governor of the Sir Gabriel Wood Mariners Home, Greenock, which appointment he held until he joined the Ocean Weather Ship Service in 1955.

We offer our sympathy to his widow. A. D. W.

RETIREMENT.—MR. H. MATTHEWS retired on 1st October, 1963, after 48 years at sea as a radio officer.

Henry Matthews was born at Wemyss, Fifeshire, in 1898 and secured his first radio certificate in 1915, joining the s.s. *Manhattan* of the old Atlantic Transport Line in May of that year.

During the First World War he was torpedoed three times but sailed unharmed throughout the second.

During his 48 years at sea as a radio officer Mr. Matthews naturally served in many different types of ship ranging from the *King Edward*, a Clyde pleasure steamer, taken over during the war and employed as a troopship between South Coast ports and France, to the Cunard White Star liner *Britannic*. His last foreign-going ship was the *Southern Cross* in which he spent eight years, but he spent the last three months of his career in the Isle of Man steamer *Snaefell*.

Personal record cards for radio officers were not kept in the Meteorological Office before the Second World War, but when they were started in 1946 Mr. Matthews was one of the first to appear when he contributed to a meteorological logbook sent in by the *Cavina* in May 1946. His voluntary service on our behalf thereafter was continued in the *Monarch of Bermuda*, *Atlantis*, *New Australia* and *Southern Cross*. During this time he gained twelve Excellent Awards.

The writer made one ballast voyage to New Zealand via the Cape and home round the Horn with him some 25 years ago. These tedious voyages in slow coal-burning cargo ships always brought out the qualities which make a good shipmate; Matthews had them.

We wish him health and happiness in his retirement.

L. B. P.

Notices to Marine Observers

COLLECTION OF SHIPS' RADIO WEATHER MESSAGES IN THE INDIAN OCEAN

Information has been received from the World Meteorological Organisation that the French authorities have arranged that the radio station at New Amsterdam Island in the South Indian Ocean (37° 50'S, 77° 34'E) will collect radio weather messages from shipping in the zone south of 40°S and between 35° and 90°E. Such reports as are received in this way will be retransmitted to the South African Meteorological Centre at Pretoria.

Details of New Amsterdam radio station are as follows:

Call sign: FQF2
Working frequencies: 500 k/cs and 8690 k/cs
Watch times for SHIP reports: from 0545 to 0615 GMT and from 1145 to 1215 GMT

This arrangement, combined with the arrangement whereby British, Commonwealth, and Irish ships send their messages to the Naval radio station at Mauritius, when unable to communicate direct with other appropriate stations in the various 'reporting areas', should help considerably in the provision of a better network of reports from merchant ships in the Indian Ocean area. Complaints have been received from time to time about the difficulties that ships in the middle of this ocean have of clearing their messages direct to stations ashore, and this is not very surprising when one considers the distances that are involved in such cases.

Information has also been received that meteorological authorities at New Amsterdam Island will issue forecasts to shipping, on request, for the area comprised between 60° and 90°E and south of 30°S.

ERRATA

The Marine Observer, July 1963, p. 102:

Para 5, line 4: *for* 1828 *read* records began there in 1878

Para. 5, line 5: *after* coldest *add* anywhere in the London area.

The Marine Observer, October 1963, page 195:

Line 17: *for* south of east *read* south of west.

The lower line of the key at the foot of the page should be broken.

Fleet Lists

Corrections to the list published in the July 1963 number of *The Marine Observer.*

GREAT BRITAIN (Information dated 24.10.63)

The following ships have been recruited as Supplementary Ships:

NAME OF VESSEL	DATE OF RECRUITMENT	CAPTAIN	OBSERVING OFFICERS	OWNER/MANAGER
British Chivalry	27.5.63	A. Hicks ..	R. B. Pain, J. R. Bruce ..	B. P. Tanker Co., Ltd.
Dido	17.10.63	J. Thatcher..	S. Church, M. J. Hogan ..	Bristol S.N. Co., Ltd.
Gloxinia ..	13.8.63	J. Shaw ..	E. Hutchinson, W. Sutherland, D. Staniforth	Stag Line
Hero	30.5.63	C. E. Knight	R. Mudway, M. Goodwin ..	Bristol S.N. Co., Ltd.
Springheather ..	19.9.63	J. Cowie ..	D. Mair	T. E. Kettlewell & Co., Ltd.

The following ships have been deleted:

Anno, Anselm, Arabia, Arakaka, Asia, Athelfoam, Baron Glenconner, Beaverglen, Birmingham City, Brisbane Star, British Consul, Calgaria, Catford, City of Carlisle, Greathope, Innesmoor, Manchester Vanguard, Matheran, Oakwood, Orion, Perthshire, Southern Harvester, Tana, Trelissick, Tyrone, Woodford, Zena.

The following coasting vessels ('Marid' Ships) have been recruited:

NAME OF VESSEL	CAPTAIN	OWNER/MANAGER
B.P. Transporter ..	P. Brown	Shell Mex & B.P., Ltd.
Cantick Head	A. E. Alvis	A. F. Henry & MacGregor, Ltd.
Croydon	H. D. N. D'Evelin	South Eastern Gas Board
Dorset Coast	W. R. Walker	British Transport Commission
Ettrick	J. Murray	Geo. Gibson & Co., Ltd.
Melrose	J. MacKenzie	Geo. Gibson & Co., Ltd.

The following ships have been deleted:

Adriatic Coast, Deal, Duke of York, Falaise, Karri, Loch Broom, Mayfair Sapphire, Ringdove, Rollo, Suffolk Coast.

GREAT BRITAIN (Information dated 21.10.63)

The following ships have been recruited as Selected Ships:

Name of Vessel	Date of Recruitment	Captain	Observing Officers	Senior Radio Officer	Owner/Manager
Amoria	2.5.63	F. R. Garrod	R. G. Taylor, J. A. Marshall	E. C. Mackenzie	Shell Tankers, Ltd.
Beaverash	27.3.63	R. Walgate	R. M. H. Hall, D. Bruce, M. Brewer	R. Cockett	Canadian Pacific Line
Benarty	29.7.63	C. Donnelly	R. H. Gavine, A. Ross, J. Craigen	W. Paterson	Ben Line
Benrinnes	25.9.63	R. Griffiths	W. C. MacKay, W. J. Milne, I. Fletcher	W. Parkinson, M.B.E.	Ben Line
Brandon Priory	20.6.63				Warwick Tanker Co., Ltd.
British Cygnet	8.10.63	N. Johnson	J. Aitchison, S. Hunter, N. Cheshire	M. Linn	B.P. Tanker Co., Ltd.
Caltex Saigon	29.5.63	A. Anderson	W. A. Hursey, E. T. Turner, D. T. McLellan	—. MacDonald	Overseas Tankship (U.K.), Ltd.
Cannanore	28.5.63	B. W. Webster	J. S. Hanna, A. Faulkner, F. N. Adamson	S. D. North	P. & O. Orient Line
Carmania	29.3.63	W. J. Law, R.D.	C. C. Walker, M. J. Pratt, P. Walton	C. H. Pennington	Cunard Line
City of Glasgow	7.5.63	B. T. Wortley	M. W. N. Smith, R. S. Purkiss, D. M. Bridge	C. B. Smith	Ellerman Lines
Clan Macgowan	19.4.63	C. M. Powell, M.B.E.	G. R. Spittal, P. C. Byrne, J. R. Hobkirk	W. S. Joice	Clan Line
Colina	1.7.63	W. S. Joyce	C. McKinnon, P. J. Telford, A. D. Naismith	J. Bailey	Donaldson Line, Ltd.
Dukesgarth	20.7.63	N. Richardson	D. V. Wood, A. J. Stuart, D. Cory	P. Dunne	Wm. Cory & Son, Ltd.
Esso Warwickshire	6.4.63	H. Jones	C. R. D. French, R. Fortune, J. Humble, M. Barr	M. Blythe	Esso Petroleum Co., Ltd.
Explorer	15.8.63	A. Sutherland	A. J. Watkins, F. Curry, R. Knock	D. Holden	Harrison Line
Flintshire	22.4.63	G. Edge	M. E. Leale, D. S. Walker, M. E. Tomlin	D. J. Gerrard	Glen Line
Franconia	24.5.63	R. J. Nicholas, R.D.	H. Dormer, A. MacKeller, T. A. Bell	D. Robson	P. & O. Orient Line
Fred Everard	2.10.63	W. G. Hunt	J. A. Tweddle, J. MacKinnon		F. T. Everard & Sons, Ltd.
Glenfalloch	20.9.63	T. R. Walker	D. J. Metcalf, H. F. Teare	W. Britton	Glen Line
Glenogly	18.6.63	W. J. Moore, D.S.C., R.D.	A. J. F. Dack, D. H. Clark, D. Gallagher	J. M. Watson	Glen Line
Hazelmoor	28.8.63	E. Howlett	H. Anson, J. Hall, H. Burns	W. James	Moor Line
Horomya	19.9.63	A. N. Rylett	B. P. Randoll, A. M. Tennant, G. F. J. Hall		Shell Tankers, Ltd.
Iron Age	4.4.63	G. E. Dixon	M. T. Richardson, H. Graham, E. Cowell	D. Smith	Common Bros., Ltd.
King City	25.4.63	F. J. Johns	B. A. Boyer, C. Davies	G. Davies	Sir Wm. Reardon Smith & Sons
Media	16.10.63				
Mahout	5.7.63	J. B. Newman	J. B. Watson, D. Cosker, T. Spriggins	D. Butterworth	Brocklebank Line
Manchester Commerce	27.6.63	A. Starmer	J. H. Kirkham, D. R. Nutton, J. S. Watson	D. Hodgson	Manchester Liners
Merchant Royal	25.7.63	T. J. Ryba	J. Knight, J. Symon, J. MacKay	B. A. Whellans	Drake S.S. Co., Ltd.
Mercury	3.4.63	G. H. C. Reynolds	D. J. Hider, W. J. Venables, M. Munphrey, D. S. MacFarlane	J. Otley	Cable & Wireless, Ltd.
Pegu	4.3.63	K. S. Marsh	J. R. Pearson, A. J. Milmine, A. M. Smart	J. H. Brown	Henderson Line
Port Lyttelton	10.4.63	A. W. Kensett	P. Bush, N. Hurst, N. A. Rea	D. R. Uglow	Port Line
Rossetti	8.7.63	R. T. Mudd	P. W. Fletcher, M. Flanagan, R. Hall, —. Soloman	—. Glennon	Lamport & Holt Line
San Edmundo	12.7.63	C. D. Michael	B. Ashley, G. Bradley, B. J. Mackle		Shell Tankers, Ltd.
San Ernesto	16.8.63	W. Plenty	E. Roberts, G. Anderson, J. H. Gadsdon		Shell Tankers, Ltd.
Sheldrake	5.6.63	R. Langley	A. Goonasekera, D. Wardrop, K. Sheridan	H. Twiddleton	General S.N. Co., Ltd.
Silverbeck	4.6.63	A. A. Walker	J. V. Gilbert, M. McGregor, W. Ross		Silver Line
Sunek	3.7.63	H. R. L. Syrerson	R. C. Green, P. A. Dyer, K. Dutton	J. McNally	Saguenay Shipping Ltd.
Trefusis	16.8.63	I. M. Prior	D. R. Mitchell, A. V. Rowles, M. Cooper		Hain S.S. Co., Ltd.
Tremayne	30.9.63	C. D. Abbott, D.S.C., R.D.	M. Ball, D. C. Perberthy, L. Ridyard	M. Scully	Hain S.S. Co., Ltd.
Welsh Herald	17.6.63	A. S. Anthony	H. P. Davies, W. Davies, D. M. Ward	J. Watson	Welsh Ore Carriers, Ltd.
Weybridge	14.6.63	E. A. A. Pierce	J. Coleman, J. R. Timms, M. W. England	P. Whittle	Watts, Watts & Co., Ltd.
Zaphon	1.5.63	W. S. Atkinson	G. V. Underhill, W. Grant, D. Martin	T. Gardner	Shell Tankers, Ltd.

GREAT BRITAIN (cont.)

The following skippers and radio operators have been added to the Trawler Fleet List.

Skipper	Radio Operator	Trawler Owner/Manager
B. A. Ashcroft ..	A. J. Nettleship / J. Connaughton	Hellyer Bros., Ltd.
G. Atherton	R. R. N. Laing	Hudson Bros., Trawlers, Ltd.
E. R. Billaney	R. T. Murphy	Hudson Bros., Trawlers, Ltd.
W. Fry	W. B. Sayer	Kingston Steam Trawling Co., Ltd.
A. Jensen	L. Hought	St. Andrew's Steam Fishing Co. Ltd.
P. May	J. H. Large	Thomas Hamling & Co., Ltd.
M. Osborne	A. Ramsay	Hudson Bros., Trawlers, Ltd.
T. Payne	E. Smith	Hudson Bros., Trawlers, Ltd.
E. Thundercliffe ..	C. Duplock	Hellyer Bros., Ltd.
R. White	J. H. Large	Thomas Hamling & Co., Ltd.

CANADA (Information dated 23.9.63)

The following ships have been recruited as Selected Ships:

Cartier (Govt. of Canada)
Narwhale (Govt. of Canada)
Relay (Govt. of Canada)
Rapid (Govt. of Canada)
Simon Fraser (Govt. of Canada)

The following ship has been recruited as a Supplementary Ship:

Princess of Acadia (Canadian Pacific Railways)

The following ship has been deleted:

Princess Helene

MALAYSIA (Information dated 2.10.63)

The following ship has been deleted:

Marudu

HONG KONG (Information dated 14.10.63)

The following ships have been recruited:

Eastern Moon (Indo-China S.N. Co. Ltd.,
Halldis (Norwegian Asia Line)
Star Antares (Johnson Line)

Deleted:

Johore Bahru and *Kota Bahru*

INDIA (Information dated 23.10.63)

The following ship (formerly a Supplementary Ship) has been recruited as a Selected Ship:

Jaladhan (Scindia S.N. Co. Ltd.)

The following ships have been recruited as Supplementary Ships:

Jag Jamna (Great Eastern Shipping Co. Ltd.)
Jala Ratna Usha (Scindia S.N. Co. Ltd.)
Laxmi Jayanti (Jayanti Shipping Co. Ltd.)
Rama Jayanti (Jayanti Shipping Co. Ltd.)
Vishva Prem (Shipping Corporation of India Ltd.)

The following ships have been deleted:

Dumra, Jala Kanta

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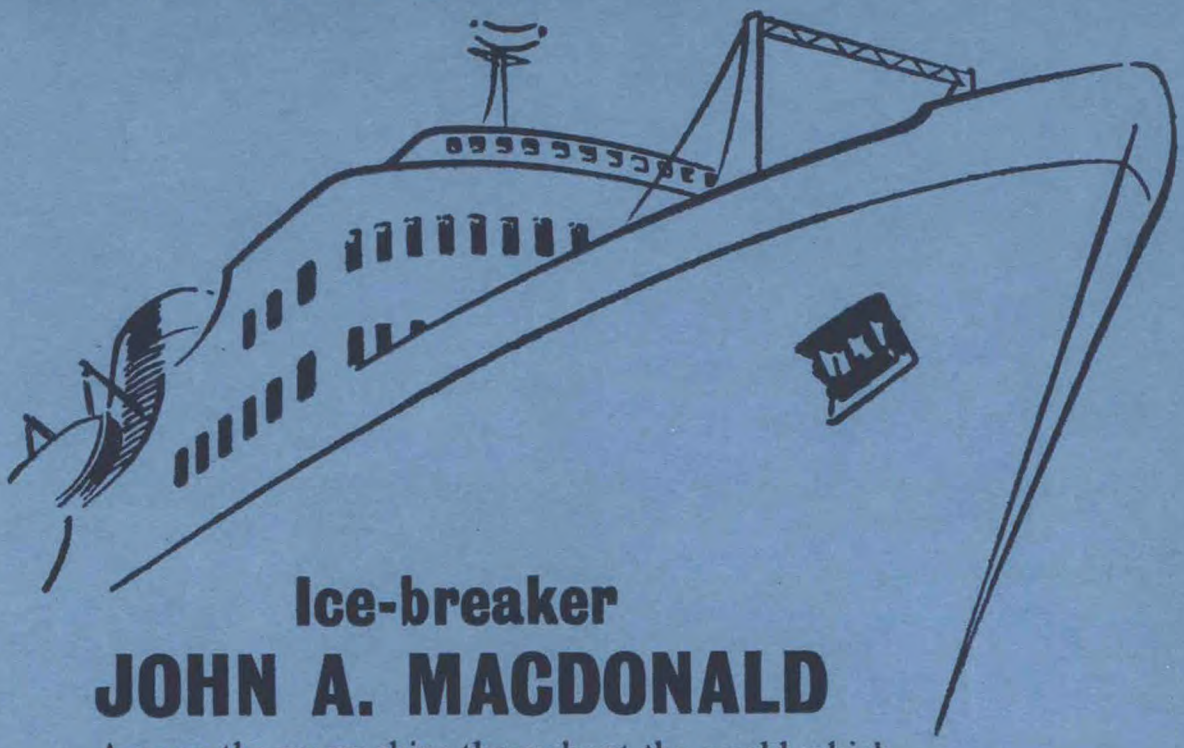
Wt. 0008. K.15. 1/64. G3307

MUFAX IN SHIPS



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This ship is greatly assisted in its difficult task by the installation of a Muirhead Recorder which forms an essential part of the vast array of equipment aboard this vessel.

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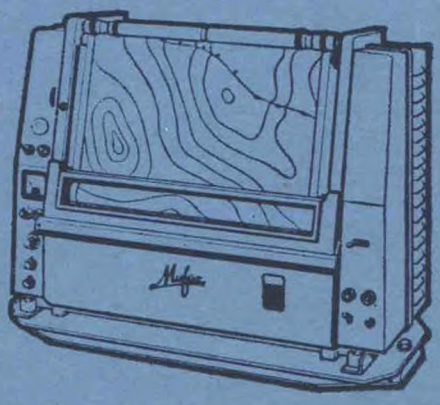

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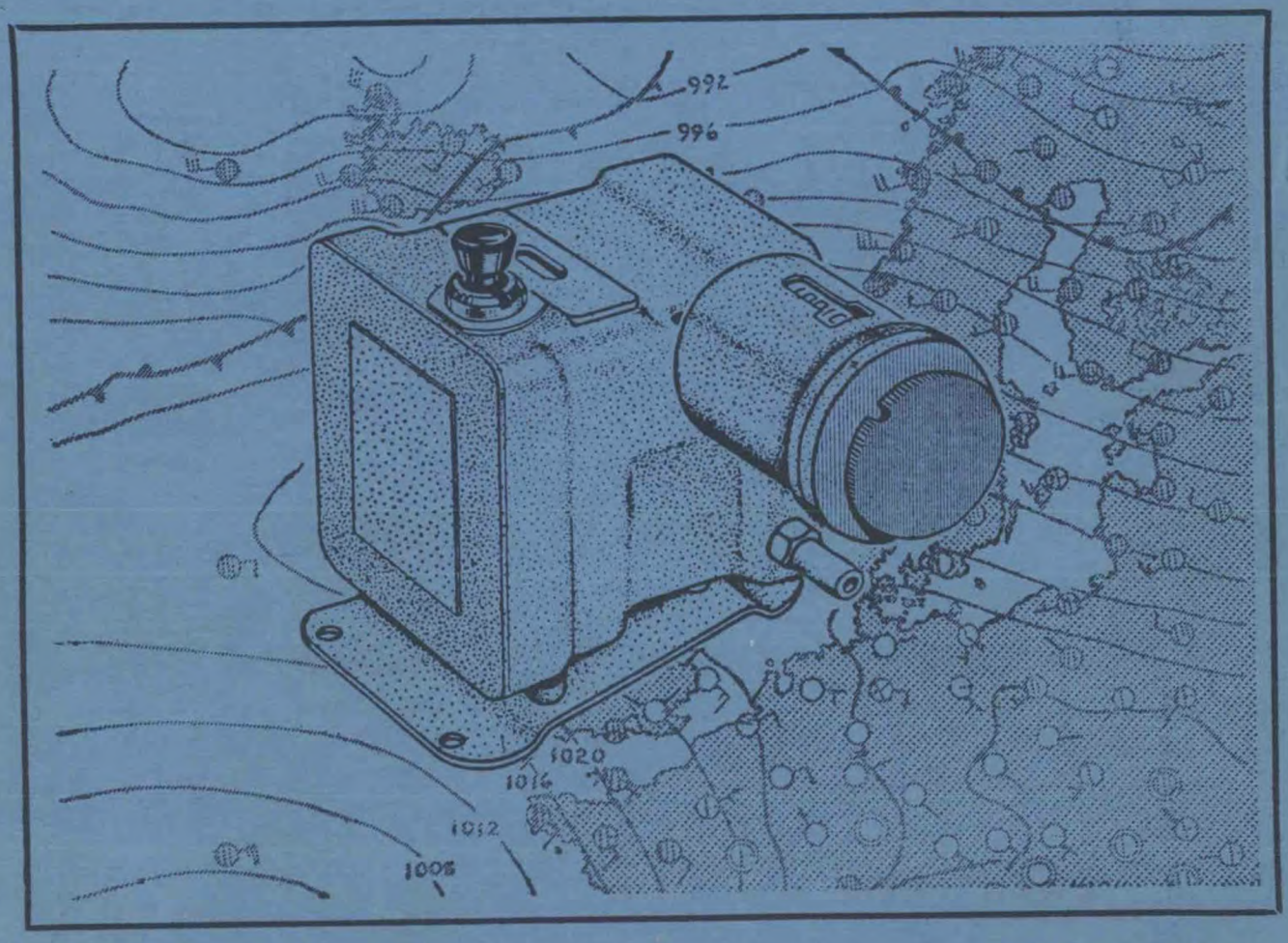

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